



# PHOENIX Quadro

# PHOENIX Quadro dry

Helium leak detector

Translation of the original operating instructions

Catalog No.

250000V02 (EU)

251000V02 (US)

251100V02 (JP)

250001V02 (dry, all countries)



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# 1 About these instructions

This document applies to the software version stated on the title page.

Product names may occur in the document, which are added for identification purposes only and belong to the respective owner of the rights.

## 1.1 Other associated documents

PHOENIX Protocol Descriptions	300701205_002
Test leak TL7 Instruction manual	GA300382582_001, 300382582_002

## 1.2 Target groups

This instruction manual is intended for the operator of the device and at technically qualified specialists, with experience in the field of leak testing technology.

## 1.3 Warnings



### **⚠ DANGER**

Imminent hazard resulting in death or serious injuries



### **⚠ WARNING**

Hazardous situation resulting in potential death or serious injuries



### **⚠ CAUTION**

Hazardous situation resulting in minor injuries

### **NOTICE**

Hazardous situation resulting in damage to property or the environment

## 1.4 Definition of terms

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### Mention of helium in the manual

The device is a helium leak detector. If you want to use a forming gas instead of helium to detect the hydrogen contained therein, the information for helium also applies to hydrogen.

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### Automatic tuning / mass setting

This function adjusts the mass spectrometer so that a maximum leak rate indicator is achieved. In order to detect a maximum ion current with the ion detector, the control computer adjusts the voltage for accelerating the ions within the selected mass range accordingly.

During each calibration, there is an automatic adjusted.

### Operation mode

The leak detector distinguishes between the operation modes "vacuum" and "sniffing". With the operation mode "vacuum", generally the tracer gas flows into the test object. The pressure in the test object is less than the ambient pressure.

In the operation mode "sniffing" the tracer gas flows out from the test object and is extracted with a sniffer probe. The pressure in the test object is greater than the ambient pressure.

### FINE

FINE denotes the connection to the turbo molecular pump for inlet pressures up to 2 mbar. This is also used for the "sniffing" operation mode.

### Forming gas

Forming gas is a collective term for gas mixtures of nitrogen and hydrogen.

### GROSS

GROSS denotes the connection to the turbo molecular pump with the lowest sensitivity. This allows high inlet pressures (up to 15 mbar).

### Internal helium background

The measurement system of the leak detector also contains a residual amount of helium. This creates an internal measurement signal component (background signal), which overlaps the display of the leak right from the beginning and thus disturbs the search for leaks.

So that this background signal can be suppressed, an internal "background suppression" can be activated with the factory settings. When pressing the START button, the currently internal measuring signal is counted as helium background and subtracted from the measurement signal. If the leak detector has not been in the "Standby" or "Vented" mode for 20 seconds, the last used internal helium background is deducted.

### **Minimum detectable leak rate**

The minimum detectable leak rate which can be detected by the leak detector under ideal conditions ( $< 5 \times 10^{-12}$  mbar l/s).

### **ULTRA**

ULTRA denotes the connection to the turbo molecular pump for the measurement range with the highest sensitivity at inlet pressures below 0.4 mbar (adjustable).

### **Background signal**

Helium or hydrogen (as part of water) are natural components of air.

Operation mode "Vacuum": Before any leak detection, a certain amount of the adjusted tracer gas is already in the volume on the surfaces of the test chamber, supply lines, and even in the leak detector itself. This certain amount of tracer gas generates a measurement signal which is called the "Background signal". The ongoing evacuation of the test chamber continuously reduces this background signal.

Operation mode "Sniffing": Ambient air is continuously fed into the leak detector via the sniffer line. The amount of helium or hydrogen occurring naturally in air creates a constant background signal.

### **Foreline pressure**

Pressure of the backing pressure between the turbo molecular pump and the backing pump.

### **ZERO**

There is helium that is weakly bound to the surfaces of a specimen as a natural part of the ambient air and is pumped bit by bit into the measurement system of the leak detector. It produces a slowly decreasing measurement signal.

If you want to hide this background signal or the display of existing leaks, then use the function ZERO.

## 2 Safety

### 2.1 Intended use

The device is a leak detector for detecting and measuring leaks in test objects. The device is suitable for leak detection using the vacuum method and the sniffer method.

- Operate the device only according to this instruction manual.
- Comply with application limits, see "Technical Data".

#### Improper use

Avoid the following, non-intended uses:

- Use outside the technical specifications, see "Technical Data"
- Using the device with detectable defects or defective power switch
- Test of wet or damp test objects
- Pumping down of explosive, aggressive, corrosive, flammable, toxic or reactive substances
- Pumping down of condensible fluids and vapors
- Pumping down of gases contaminated with particles
- Using the sniffer line handle over a long period of time, leading to fatigue.
- Shock loads or vibrations
- Using the device in potentially explosive atmospheres
- Placing the device in a location where strong electromagnetic fields from third party equipment may affect the measurement results.
- Inspecting electrically live conductors or objects with a sniffer line
- Sudden venting of vacuum systems
- Connect a test object that is not vacuum resistant
- Pumping out gases containing halogens such as fluorine or chlorine in high concentration or over a long period of time. Use with refrigerants or SF6.
- Operation without exhaust pipe for devices with oil-sealed backing pump
- Operation of a device with oil-sealed backing pump if the oil level is too low

Note: This device is not intended to be used in residential areas and cannot ensure adequate protection of radio reception in such environments.

### 2.2 Owner requirements

The following notes are for companies or any person who is responsible for the safety and effective use of the product by the user, employee or third party.

## Safety conscious operation

- Operate the device only if it is in perfect technical condition and has no damage.
- Only operate the device in accordance with this instruction manual, in a safety and risk conscious manner.
- Adhere to the following regulations and observe their compliance:
  - Intended use
  - General applicable safety and accident prevention regulations
  - International, national and local standards and guidelines
  - Additional device-related provisions and regulations
- Only use original parts or parts approved by the manufacturer.
- Keep this instruction manual available on site.

## Personnel qualifications

- Only instructed personnel should be permitted to work with and on the device. The instructed personnel must have received training on the device.
- Make sure that authorized personnel have read and understood the operating instructions and all other applicable documents.

## 2.3 Duties of the operator

- Read, observe, and follow the information in this manual and in the work instructions provided by the owner. This concerns in particular the safety instructions and warnings.
- Always observe the complete operating instructions for all work.
- If you have any questions about operation or maintenance that are not answered in this manual, please contact Customer Service.

## 2.4 Dangers

The measuring instrument was built according to the state-of-the-art and the recognized safety regulations. Nevertheless, improper use may result in risk to life and limb on the part of the user or third parties, or damage to the measuring instrument or other property may occur.

### Hazards due to liquids and chemicals

Liquids and chemical substances can damage the instrument.

- Comply with application limits, see "Technical Data".
- Do not suck up liquids with the instrument.
- Avoid sniffing gases, such as hydrogen, above the lower explosion limit. The allowable composition of venal gas mixtures can be read in the safety data sheets of the respective manufacturers.

	<ul style="list-style-type: none"> <li>• Only use the device away from areas with a risk of explosions.</li> </ul>
<b>Dangers from electric power</b>	<p>There is a danger to life from the contact of conductive parts inside the device.</p> <ul style="list-style-type: none"> <li>• Disconnect the device from the power supply prior to any installation and maintenance work. Make sure that the electric power supply cannot be reconnected without authorization.</li> </ul> <p>The device contains electric components that can be damaged from high electric voltage.</p> <ul style="list-style-type: none"> <li>• Before connecting the device to the power supply, make sure that the supply voltage specified on the device is the same as the local power supply.</li> </ul>
<b>Explosion hazard</b>	<p>Hydrogen is a flammable and explosive gas.</p> <ul style="list-style-type: none"> <li>• Use only tracer gases with a concentration of hydrogen that cannot explode in combination with oxygen. The allowable composition of venal gas mixtures can be read in the safety data sheets of the respective manufacturers.</li> </ul>
<b>Danger from suction effect at the inlet flange</b>	<p>When operating the device in operation mode Vacuum there will be a negative pressure created at the inlet flange.</p> <p>The suction effect on hands or other body parts can cause injuries or trigger uncontrolled movements from a person being frightened.</p> <ul style="list-style-type: none"> <li>• Pay special attention to this danger when using a remote control!</li> <li>• Connect the inlet flange with a test rig or seal it off using a blank flange.</li> </ul>
<b>Risk of injury by tripping</b>	<p>Cables or hoses can become tripping hazards on a leak detector: Mains cable, hoses to the "Vent", "Exhaust" and sniffer line.</p> <ul style="list-style-type: none"> <li>• Prevent tripping hazards when placing the device and connecting lines.</li> <li>• Don't block any roads with a sniffer line.</li> </ul>
<b>Injury from bursting objects</b>	<p>There is risk of injury from bursting objects caused by a test object notwithstanding the vacuum pressure when a test object is connected.</p> <ul style="list-style-type: none"> <li>• Take appropriate precautions.</li> </ul>

## 3 Shipment, Transport, Storage

### Scope of delivery

#### Device with oil-sealed backing pump (EU), catalog number 250000V02

Item	Quantity
PHOENIX Quadro (EU) Leak detector	1
Power supply cable EU	1
Power supply cable UK	1
Blank flange DN25 KF	1
Clamping ring DN25 KF	1
Centering ring DN25 KF	1
Set of spare fuses	1
Plug for exhaust	1
Operating instructions (English)	1
Operating instructions (German)	1
Protocol Descriptions (English only)	1
Inspection certificate calibration leak	1
Inspection certificate leak detector	1

#### Device with oil-sealed backing pump (US), catalog number 251000V02

Item	Quantity
PHOENIX Quadro (US) Leak detector	1
Power supply cable US	1
Blank flange DN25 KF	1
Clamping ring DN25 KF	1
Centering ring DN25 KF	1
Set of spare fuses	1
Plug for exhaust	1
Operating instructions (English)	1
Protocol Descriptions (English only)	1
Inspection certificate calibration leak	1
Inspection certificate leak detector	1

**Device with oil-sealed backing pump (JP), catalog number 251100V02**

Item	Quantity
PHOENIX Quadro (JP) Leak detector	1
Power supply cable US	1
Blank flange DN25 KF	1
Clamping ring DN25 KF	1
Centering ring DN25 KF	1
Set of spare fuses	1
Plug for exhaust	1
Operating instructions (English)	1
Protocol Descriptions (English only)	1
Inspection certificate calibration leak	1
Inspection certificate leak detector	1

**Device with dry backing pump (all countries), catalog number 250001V02**

Item	Quantity
PHOENIX Quadro dry Leak detector	1
Power supply cable US	1
Power supply cable EU	1
Power supply cable UK	1
Blank flange DN25 KF	1
Clamping ring DN25 KF	1
Centering ring DN25 KF	1
Set of spare fuses	1
Operating instructions (German)	1
Operating instructions (English)	1
Protocol Descriptions (English only)	1
Inspection certificate calibration leak	1
Inspection certificate leak detector	1

- Check the delivery contents after receiving the product to ensure it is complete.

**Transport**



## **⚠ WARNING**

### **Danger of injury due to high tare weight**

Transport of the unpacked device over a shorter distance

- ▶ Do not lift the device by the inlet flange.
- ▶ Lift and transport the device only in pairs.
- ▶ To prevent the device from tilting, use both hands to grasp the recessed grips on the sides of the device to lift the device .

## **NOTICE**

### **Material damage if incorrect transport packaging is used**

Transport over long distances

- ▶ Keep the original packaging.
- ▶ Only transport the device in its original packaging.

## **Storage**

Store the device taking into consideration the specifications, see "Specifications".

### **See also**

 [Technical data \[▶ 28\]](#)

## 4 Description

### 4.1 Function

The device is a leak detector for detecting and measuring leaks in test objects. The device is suitable for leak detection using the vacuum method and the sniffer method.

- When using the vacuum method the test object is evacuated and subjected to Helium or forming gas from the outside. To do this it is necessary to establish a vacuum connection between the device and the test object.
- When using the sniffer method an over-pressure is established in the test object using Helium or a forming gas. The test object is then inspected on the outside using a sniffer probe.

### 4.2 Operation modes

#### 4.2.1 Operation mode “Vacuum”

The inlet flange is located on the upper side of the device.

You can mount a suitable external calibration leak on the inlet flange and perform an external calibration, see also “External calibration [▶ 63]“. Alternatively, you can perform an internal calibration, see also “Internal calibration [▶ 63]“.

To be able to perform leak detection using the vacuum method the inlet flange must be connected to the desired specimen.

If the pressure in the specimen is less than the surrounding pressure, then Helium (which is sprayed over the specimen) can penetrate into the specimen if there is a leak. Helium can be detected in the leak detector using a mass spectrometer.

#### 4.2.2 Operation mode “Sniffing”

To be able to inspect test objects under overpressure with a sniffer line you can connect the sniffer SL300 / SL301.

#### SL300

The vacuum connection of the sniffer line SL300 is connected to the upper side of the device on the inlet flange.

The electrical connection of the sniffer line SL300 is connected to the connector "ACCESSORIES" on the rear of the device, see "Connections for accessories and control signals [▶ 26]“.

## 4.3 Device setup

### 4.3.1 Overall device

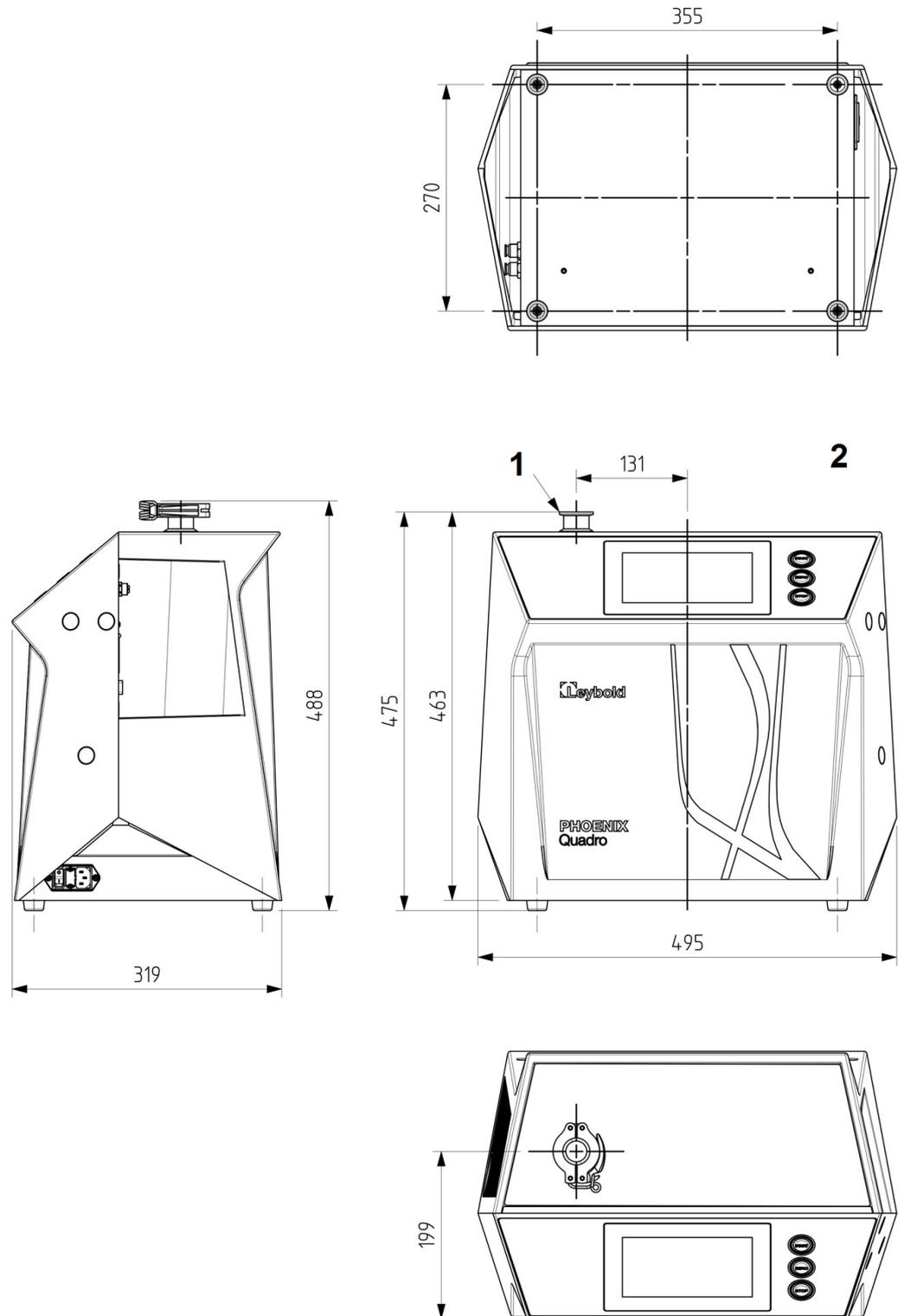


Fig. 1: Dimensional drawings

1	Connection flange DN25 for test object	2	View without quick release
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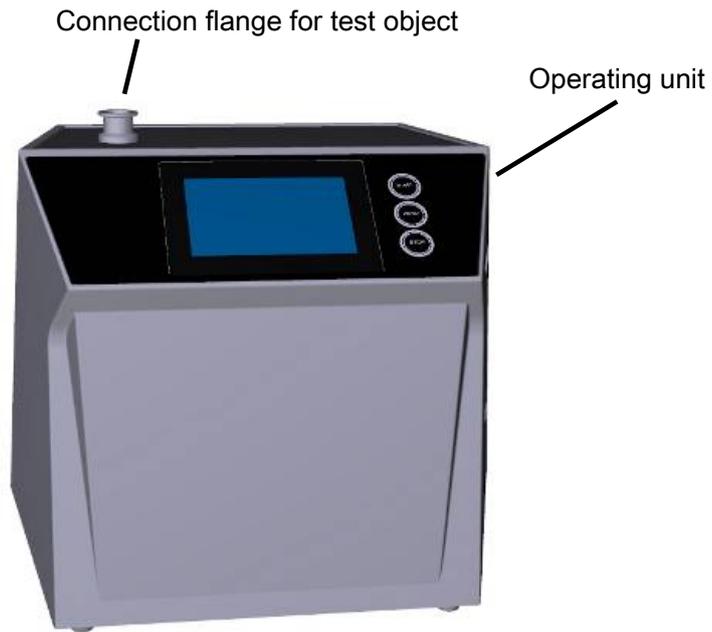


Fig. 2: Front view

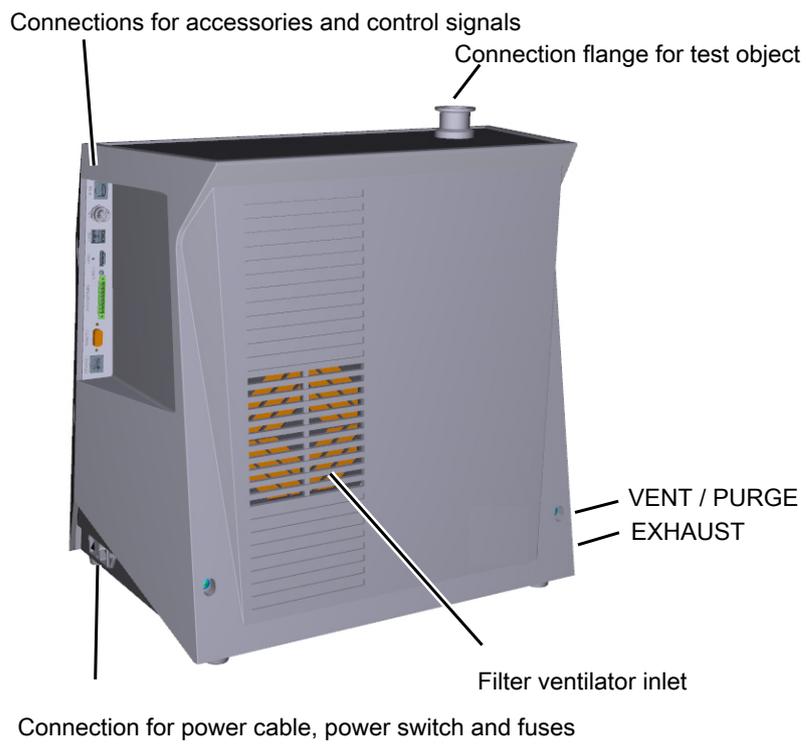


Fig. 3: Back view

### 4.3.2 Operating unit



Fig. 4: Control unit - front view

The control unit consists of a touchscreen and a control panel with the buttons Start, STOP and ZERO (background suppression) on the housing.

See also "Assembly of the touchscreen [▶ 22]", see also "START button [▶ 19]".

The LED lighting of the buttons on the control panel changes its display color according to the device state, see also "Meaning of the button LEDs [▶ 21].

The remote control RC310 is optionally available, see also "Accessories and spare parts [▶ 103].

You can also operate the device using a notebooks or tablets, see also "Operate leak detector via web browser (wireless LAN) [▶ 113]".

#### 4.3.2.1 START button

- To start the measurements.
- Can be operated via touchscreen or on the control panel (Hardware button).
- If you press the START button on the control panel again during measurement, the maximum leak rate ( $Q_{max}$ ) that has occurred since START is displayed. See also "Assembly of the touchscreen [▶ 22]".
- If you press the START button on the control panel during measurement, the maximum leak rate display is updated.

Function	Touchscreen	Control panel
Starting		START button
Display maximum leak rate	Cannot be operated via touchscreen	Press the START button again.

### 4.3.2.2 STOP button

- To stop the measurements.
- Can be operated via the touchscreen of the control panel.
- Using the STOP button on the control panel you can do more than just stopping the measurements but also perform ventilation.

Function	Touchscreen	Control panel
Stop		STOP button
Vent		Press the STOP button again and keep it pressed for approx. 2 seconds.  (Prerequisite is the setting "ventilation mode" "manual", see "Activate vacuum ranges [▶ 53]".)

### 4.3.2.3 ZERO button

- To hide the "Background signal", see also "Definition of terms [▶ 8]".
- Can be operated via the touchscreen of the control panel.
- Using the ZERO button you can switch ZERO on and off. For further details see "Set and use the function ZERO [▶ 56]".

Function	Touchscreen	Control panel
Background suppression ON		ZERO button
Background suppression OFF		Press the ZERO button again and keep it pressed for approx. 2 seconds.

The actual measured leak rate is considered to be a background signal. Depending on the selected variant of operation mode the background signal is hidden until the display limit of the respective vacuum range is reached.

After pressing the ZERO button, background suppression is automatically adjusted to the course of the falling leak rate signal. As a result, the detection of leaks is possible even with slowly falling signal.

Display limits according to factory setting:

$1 \times 10^{-7}$  mbar l/s in GROSS

$1 \times 10^{-10}$  mbar l/s in FINE

$1 \times 10^{-12}$  mbar l/s in ULTRA

To switch-off the function ZERO again, press the button ZERO for about 2 seconds.

The function ZERO should be activated only if the leak rate signal is stable and no leak is measured. See also "Set and use the function ZERO [► 56]".

### See also

 Activate vacuum ranges [► 53]

#### 4.3.2.4 Meaning of the button LEDs

START button LED	STOP button LED	Meaning
Off	Flashing red	No connection to the control unit
Pulsing blue	Pulsing blue	Run-up
Off	Green	Standby vented (Vent valve open)
Off	Blue green	Standby pumped out (Vent valve close)
Pulsing green	Off	Pump down
Off	Flashing green	Internal calibration
Flashing green	Off	External calibration
Green	Off	Measuring
Yellow (warning, faulty measurement possible)	Off	Measuring with warning not acknowledged
Off	Red	Error
Red	Red	Service mode is activated

ZERO button LED	
Off	No measurement operation
Off	ZERO blocked
Blue	ZERO OFF
Flashing blue	ZERO blocked by SMART-ZERO
Green	ZERO ON
Red	Service mode is activated

### 4.3.2.5 Meaning of the status LED

The status LED is located on the back of the instrument inside of the connector block for the equipment and control signals, see also "Connections for accessories and control signals [▶ 26]".

Status LED	Meaning
Flashing red	No communication with operating unit
Flashing blue	Run-up
Blue	Standby
Flashing green	Evacuate (pumping)
Flashing green	Calibrating
Green	Measuring
Yellow	Measuring with warning not acknowledged
Red	Error

### 4.3.2.6 Meaning of the LEDs on the sniffer line SL300

Red LED	Green LED	Meaning
On	Off	In measuring mode: Setpoint 1 is exceeded
Off	On	In measuring mode: Setpoint 1 has fallen below
On	On	Leak detector runs up
Off	Off	Leak detector in standby, evacuation mode, calibration or not switched on
Flashing	Flashing	Error

### 4.3.2.7 Assembly of the touchscreen

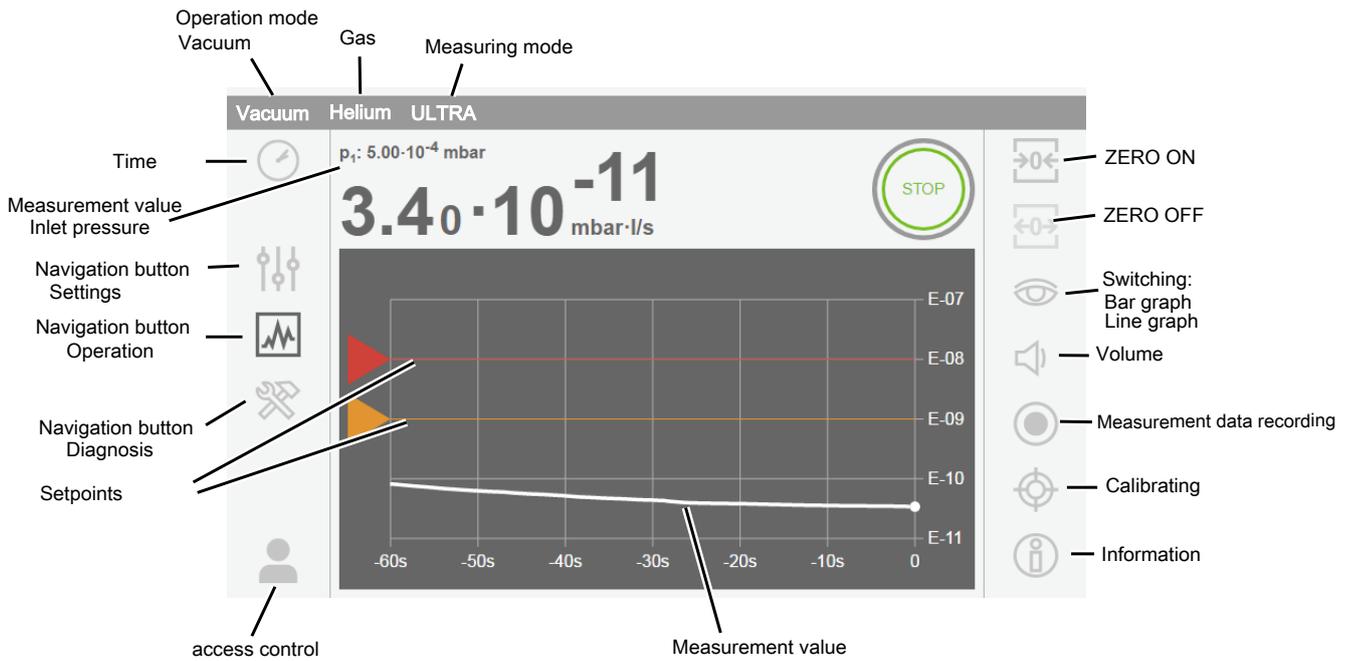


The touchscreen responds to being touched lightly. To correctly select the chosen function, avoid strong pressure.

Touching path elements will take you to the corresponding page.

Via ⊗, you will be returned to the previous page. Changed values are not saved.

You can always see symbols for the navigation on the display. Depending on the context, additional symbols and elements are added.



**Navigation buttons**

The buttons can appear in different grey tones:

- Hidden: Function inactive
- Light grey: Function can be activated
- Dark grey: Function is active

	<b>Settings</b>
	<b>Operation</b>
	<b>Diagnosis</b>

Table 1: Navigation buttons

**Function buttons**

The buttons can appear in two different grey tones:

- Light grey: Function can be activated
- Dark grey: Function is active

General function symbols

	Cancel ongoing function
	Confirm entry or selection
	Load
	Save
	Edit
	Delete

Table 2: Function buttons

**Other symbols**

	Authorization "User"
--	----------------------

	Authorization "Operator"
	Authorization "Supervisor"
	View the time or set the time

See also "Overview of Rights Groups [▶ 41]".

### 4.3.3 Vacuum connections

#### 4.3.3.1 Inlet

The inlet is located on the upper part of the device. This is a DN 25 KF flange.

If you select the vacuum leak test mode, connect the test object or the vacuum chamber onto the flange.

If you are testing applications with dust or dirt, use an O-ring with filter. In this case, the pump down times are extended.



Use this inlet also for the connection of the SL300 / SL301 sniffer line.

#### 4.3.3.2 Exhaust



#### DANGER

##### Health risk due to exhaust fumes and vapors

Depending on the connected container and the gas it is holding hazardous gases can enter the surrounding air via the exhaust of the leak detector.

If you have a device with an oil-sealed backing pump, dangerous combustion products can arise, i.e. smoke, mist, sulfur oxide, aldehyde, and free carbon dioxide.

- ▶ Make sure you have protection measure to prevent inhaling hazardous gases.
- ▶ Connect an exhaust pipe at the exhaust, see also "Exhaust [▶ 24]".

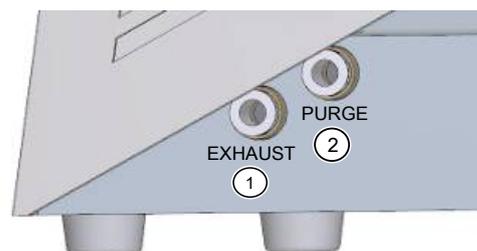


Fig. 5: Connections for exhaust, for venting and purging/gas ballast on the left of the device

1	EXHAUST: Exhaust	2	PURGE: For purge/gas ballast of the measuring system.  This connection is also used to vent the inlet (VENT).
---	------------------	---	---

At the left side of the device there is the an exhaust, see “Connections for accessories and control signals [► 26]“. This is a quick connection for hoses with an outside diameter of 8 mm.

#### 4.3.3.3 Connection for purge/gas ballast and venting

On the left side of the device is the connection for purge/gas ballast and vent, next to the "Exhaust [► 24]".

This connection is used to vent the backing pump (with wet backing pump: gas ballast ), vent the inlet and flood the TMP when the mains is switched off. This is a quick connection for hoses with an outside diameter of 8 mm.

##### Purging/gas ballast

To purge use a Helium free gas at atmospheric pressure. The surrounding air may be contaminated with traces of Helium due to spraying or filling up large containers. In such cases connect a gas supply line (this means Nitrogen or fresh air or similar) over the purge gas connection. The pressure in this gas line must not exceed 100 mbar overpressure above atmospheric pressure.



#### **⚠ WARNING**

##### **Risk of suffocation due to nitrogen or argon as purge gas**

The use of nitrogen or argon as purge gas may cause suffocation at high concentrations in indoor air.

- Take precautions to avoid high concentrations of these gases in enclosed spaces.

##### Vent

Normally, the specimens are vented with ambient air after completion of the test. If necessary, the test specimens can be aerated with another gas (e.g. fresh air, dry air, nitrogen, etc.) to a maximum of 100 mbar overpressure above atmospheric pressure.

##### **See also**

- 📄 Vent, Purge/Gas ballast, Regenerate [► 57]

### 4.3.4 Connections for accessories and control signals

#### NOTICE

**The electronics of the device can be destroyed.**

- ▶ Only connect devices which are provided for the appropriate interfaces.

The connections for the external devices show a safe disconnection from the mains and are within the range of the safety extra low voltage (SELV).



Fig. 6: Connections for accessories and control signals at the back side of the device.

<b>REMOTE1</b>	For connecting the remote control RC310C via cable, maximum length 28 m, or for direct connection of the radio transmitter via an adapter. The remote control is not part of the scope of delivery of the device.
<b>REMOTE2</b>	Enables the connection via radio transmitter for the radio control via a special adapter.
<b>ACCESSORIES</b>	Electrical connection for sniffer line SL300 / SL301 or partial flow system. For partial flow system see also "Set and use external partial flow system [▶ 61]".
<b>STATUS</b>	To display the status of the device, see also "Meaning of the status LED [▶ 22]".
<b>HDMI</b>	For connection to the HDMI interface of a touch monitor, maximum cable length 3 m.
	2 USB connections. To transfer data and to perform updates with an USB stick (FAT32-formatted). To connect a touch monitor via USB cable.
<b>LD</b>	Connection for bus module or IO Interface, maximum line length 10 m
	Network interface, maximum length 3 m

#### See also

- ▶ Connection for purge/gas ballast and venting [▶ 25]
- ▶ Exhaust [▶ 24]
- ▶ Connecting the leak detector to the power supply system [▶ 37]

### 4.3.5 Markings on the device



Device cannot be scrapped with the normal domestic waste.



For oil-sealed backing pump: Malfunction with closed exhaust

## 4.4 Technical data

### Mechanical data

Device with oil-sealed backing pump, catalog numbers:

250000V02 (EU), 251000V02 (US), 251100V02 (JP)

	PHOENIX Quadro
Dimensions (L × W × H)	495 mm x 318 mm x 475 mm
Weight	41 kg (1.74 lb.)
Inlet flange test object	DN 25 KF
<b>Display</b>	
Screen diagonal	7 inch
Pixel	800 x 480
Background light	LED
Colors	16.7 M

Device with dry backing pump, catalog number:

250001V02 (all countries)

	PHOENIX Quadro dry
Dimensions (L × W × H)	495 mm x 318 mm x 475 mm
Weight	35 kg (1.74 lb.)
Inlet flange test object	DN 25 KF
<b>Display</b>	
Screen diagonal	7 inch
Pixel	800 x 480
Background light	LED
Colors	16.7 M

### Electrical data

Device with oil-sealed backing pump, catalog numbers:

250000V02, 251000V02, 251100V02

	PHOENIX Quadro
Main fuse	2 x 250 V T10 A
Max. power	640 VA
Supply voltage EU	220 – 240 V, 50 Hz 230 V, 60 Hz

	PHOENIX Quadro
Supply voltage US	110 -120 V, 60 Hz
Supply voltage JP	100 V, 50 / 60 Hz
Ingress protection	IP 30
Excess voltage category	II
Electronic interfaces	REMOTE1, REMOTE2, ACCESSORIES, HDMI, USB, LD, Ethernet

Device with dry backing pump, catalog number:

250001V02

	PHOENIX Quadro dry
Main fuse	2 x 250 V T10 A
Max. power	470 VA
Supply voltage multi-range power unit	100 - 240 V, 50 / 60 Hz
Ingress protection	IP 30
Excess voltage category	II
Electronic interfaces	REMOTE1, REMOTE2, ACCESSORIES, HDMI, USB, LD, Ethernet

## Physical data

Catalog numbers:

250000V02, 251000V02, 251100V02, 250001V02

	PHOENIX Quadro, PHOENIX Quadro dry
Minimum detectable helium leak rate vacuum mode	$5 \cdot 10^{-12}$ mbar l/s
Response time	< 1 s
Maximum inlet pressure	15 mbar
Helium pumping speed ULTRA	>3.1 l/s
Detectable masses	$^4\text{He}$ , $\text{H}_2$ , mass 3
Minimum detectable helium leak rate sniffer mode	$1 \cdot 10^{-9}$ mbar l/s *)
Gas flow through sniffer line SL300	15 - 23 sccm
Measurement range	12 decades
Sound pressure level	< 53 dB(A) **)

	PHOENIX Quadro, PHOENIX Quadro dry
Run-up time	110 s
Ion source	2 long lasting iridium cathodes

\*) Under normal environmental conditions, the smallest detectable leak rate and leak rate indication is after ZERO  $1 \cdot 10^{-8}$  mbar l/s. In special devices, where the air helium is removed, for example, by flooding with nitrogen, the minimum detectable leak rate can be adjusted to  $1 \cdot 10^{-9}$  mbar l/s. Please contact Leybold in this case.

\*\*) Typical values at a distance of 1 m from the device. The A-weighted emission sound pressure level at the operator's premises is less than 65 dB (A) at all times for all foreseeable uses of the device. The noise emission measurement declaration was drawn up in accordance with the harmonized standard DIN EN ISO 3744:2011.

### Ambient conditions

#### Catalog numbers:

250000V02, 251000V02, 251100V02, 250001V02

	PHOENIX Quadro, PHOENIX Quadro dry
Max. altitude above sea level	2000 m
Maximum relative humidity	80% at 30°C, linear decreasing to 50% at 40°C
Storage temperature	- 10°C to +60°C
Operating temperature	+ 10 °C ... + 40 °C
Pollution degree	2

## 4.5 Factory settings

Leak rate setpoint 1	$1 \times 10^{-9}$ mbar l/s
Leak rate setpoint 2	$1 \times 10^{-8}$ mbar l/s
Leak rate setpoint 3	$1 \times 10^{-7}$ mbar l/s
Leak rate setpoint 4	$1 \times 10^{-6}$ mbar l/s
Automatic purging with oil-sealed backing pump	ON
Volume	2
ZERO mode	SMART
Calibration request	Off
TMP ventilation	ON
Interfaces leak rate unit vacuum operation	mbar l/s
Interfaces leak rate unit sniffer operation	mbar l/s
Interface pressure unit	mbar
TMP rotation speed	1500 Hz

Mass	4 (helium)
Log to IO Interface RS232 connection	ASCII
Analog output IO Interface channel 1	Mantissa
Analog output IO Interface channel 2	Exponent
Analog output IO Interface scaling	5 V / decade
Digital output pin 1 (IO Interface)	Calibration request (inverted)
Digital output pin 2 (IO Interface)	Error or warning (inverted)
Digital output pin 3 (IO Interface)	Setpoint 1 (inverted)
Digital output pin 4 (IO Interface)	Setpoint 2 (inverted)
Digital output pin 5 (IO Interface)	Measuring mode
Digital output pin 6 (IO Interface)	ZERO active
Digital output pin 7 (IO Interface)	Ready
Digital output pin 8 (IO Interface)	Calibration active
Digital Input pin 1 (IO Interface)	Vent
Digital Input pin 2 (IO Interface)	Sniffing
Digital Input pin 3 (IO Interface)	Start
Digital Input pin 4 (IO Interface)	STOP
Digital Input pin 5 (IO Interface)	ZERO
Digital Input pin 6 (IO Interface)	Calibrating
Digital Input pin 7 (IO Interface)	Delete
Digital Input pin 8 (IO Interface)	Gas ballast
Digital Input pin 9 (IO Interface)	Start / Stop
Digital Input pin 10 (IO Interface)	not used
Machine factor vacuum mass 2	1
Machine factor vacuum mass 3	1
Machine factor vacuum mass 4	1
Leak rate filter	AUTO
Cathode	Cathode 1 auto
Pressure monitoring SL300 (min.)	0.1 mbar
Pressure monitoring SL300 (max.)	1 mbar
Audio alarm	TRIGGER
Audio alarm delay	60 s
Beep	ON
Inlet area offset mass 2	$1.3 \times 10^{-10}$ A
Inlet area offset mass 3	$6.7 \times 10^{-14}$ A
Inlet area offset mass 4	$3.3 \times 10^{-15}$ A
Analog output IO Interface upper exponent	-5

Pressure unit (display)	mbar
Leak rate unit vacuum operation (display)	mbar l/s
Leak rate unit sniffer operation (display)	mbar l/s
Sniffer line light alarm configuration	Flashing
Sniffer line light brightness	5
Sniffer line beep	ON
Operation mode	Vacuum
Amplifier test during calibration	ON
Amplifier monitoring during measurement operation	ON
Pressure limit EVAC -> GROSS	15 mbar
Pressure limit GROSS -> FINE	2.0 mbar
Pressure limit FINE -> ULTRA	0.3 mbar
Pressure limit GLIMPSE -> P-GROSS	0.004 mbar
Max. evacuation time gross leak	600 s
Max. evacuation time measurement	1800 s
Gross leak protection leak rate limit	$1 \times 10^{-3}$ mbar l/s
Gross leak protection	Off
Particle protection	Off
Background suppression	internal only
Ventilation mode	manually
Log at the LD connection	LD
Maintenance messages	all activated
Vacuum ranges	GROSS, FINE und ULTRA (All ON)
Field bus slave address	126
Calibration leak external vacuum Hydrogen	$1 \times 10^{-7}$ mbar l/s
Calibration leak external vacuum mass 3	$1 \times 10^{-7}$ mbar l/s
Calibration leak external vacuum Helium	$1 \times 10^{-7}$ mbar l/s
Calibration leak external sniffer Hydrogen	$1 \times 10^{-5}$ mbar l/s
Calibration leak external sniffer mass 3	$1 \times 10^{-5}$ mbar l/s
Calibration leak external sniffer Helium	$1 \times 10^{-5}$ mbar l/s
Local control	ON
Clock style	Analog
Display background at standby	Off
Minimum volume	0
Language in the logon dialog	English
Diagram type	Line graph

<b>Line graph</b>		
	Scaling	Logarithmic
	Decades	4
	Autoscale	ON
	Lower diagram limit	$1 \times 10^{-12}$
	Time axis	30 s
<b>Bar graph</b>		
	Scaling	Logarithmic
	Decades	4
	Autoscale	ON
	Lower diagram limit	$1 \times 10^{-12}$
<b>Data recording</b>		
	Export format	CSV en
	Export file prefix	icmeas
	Enable	Off
	Max. database size	25000000
	Sample distance	minimal
	Time criterion	from now return
	Seconds	60
<b>WLAN</b>		
	Name (SSID)	Phoenix
	Network key	Phoenix40
	Enable	ON

## 5 Installation

### 5.1 Setup



#### CAUTION

##### **Risk of injury from lifting the heavy device**

The device is heavy and can slip out of hand.

- ▶ Do not use the inlet flange to lift the device.
- ▶ Lift and transport the device only in pairs.
- ▶ To prevent the device from tilting, use both hands to grasp the recessed grips on the sides of the device to lift the device .



#### CAUTION

##### **Risk of injury due to improper installation**

If the device is not placed on a flat, non-slip surface, it may fall and cause personal injury or property damage.

- ▶ Place the device on a level, non-slip workstation.



#### DANGER

##### **Health hazards from gases and vapors**

Operation of the leak detector may produce hazardous combustion products such as smoke, fumes, sulfur oxides, aldehydes and carbon oxides.

- ▶ For an oil-sealed backing pump, connect an exhaust pipe to the exhaust port, see also "Exhaust [▶ 24]".
- ▶ Avoid inhalation of harmful gases or oil vapors.
- ▶ Ensure an installation location with adequate ventilation.



## ⚠ WARNING

### **Danger from moisture and electricity**

Moisture entering the device can lead to personal injury due to electric shocks as well as damage to property due to short circuiting.

- ▶ Only operate the device in dry environments and only in buildings.
- ▶ Operate the device away from sources of liquid and moisture.
- ▶ Position the device so that you can always reach the power plug to unplug the device.
- ▶ Do not operate the device standing water and do not let even a drop of water or other liquids on the device.
- ▶ Prevent the device from coming into contact with bases, acids and solvents.

## NOTICE

### **Material damage from overheated device**

The device heats up during operation and can overheat without sufficient ventilation.

- ▶ Please note the technical specifications.
- ▶ Ensure sufficient ventilation, especially on the ventilation slots on the left and right of the device: There should be free space in the front, to the rear and sides of the unit of at least 10 cm.
- ▶ During operation, make sure that the filters are not clogged by dirt.
- ▶ Keep heat sources away from the device.

## NOTICE

### Operating system can be attacked via USB or Ethernet

The Linux operating system used in the leak detector is not updated automatically and can therefore contain security gaps. This vulnerability may be exploited through the Ethernet and USB interfaces of the leak detector to provide unauthorized access to the system.

- ▶ Ensure that no unauthorized person has access to these interfaces, for example through a USB port / Ethernet port lock.
- ▶ In order not to jeopardize the security of your company network, never connect the leak detector directly to the public Internet. This is true for connections over WLAN as well as over Ethernet.
- ▶ However, if you want to access the web interface of the leak detector remotely, we recommend an encrypted Virtual Private Network (VPN) connection. However, we cannot assume any guarantee for the security of VPN connections, which are provided by third parties.



### Prevention of measurement errors due to leaks in the Helium source in the device surroundings

We recommend that you regularly check around the device to a distance of 10 m all large Helium sources for gross leaks. Use a sniffer line to do this.

- 1 Place the device on a level, non-slip workstation.
- 2 Avoid tripping hazards when installing the device and connecting cables.

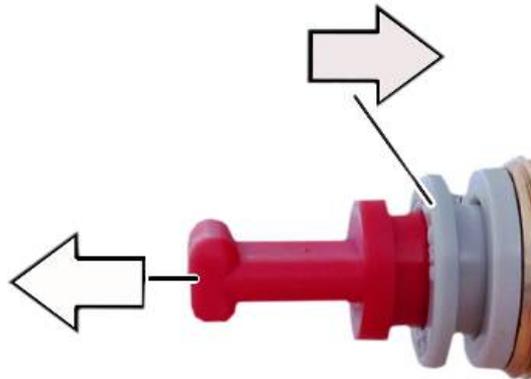
## 5.2 With oil-sealed backing pump, remove plug



### Malfunction of the pump system with inserted plug in the exhaust line

On devices with oil-sealed backing pump, the exhaust is protected by a plug against leaking oil.

- ▶ For devices with oil-sealed backing pump, remove the plug before switching it on.
- 
- ▶ To remove the plug press the release ring in the direction of the device so that the locking device releases. Pull the plug out while release ring is pressed.



## 5.3 Connecting the leak detector to the power supply system



### ⚠ WARNING

#### Danger from electric shocks

Improperly earthed or protected products may be dangerous to life in case of a fault. The use of the device is not permitted without a connected protective conductor.

- ▶ Only use the included 3-wire power cable.
- ▶ Make sure that the mains plug is always accessible.

### NOTICE

#### Damage through wrong power supply

- ▶ Only connect the device to the power supply when the tension shown on the type plate corresponds to the one of your power supply connection.

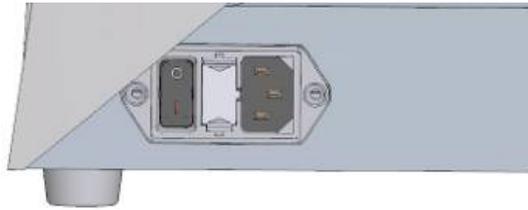


Fig. 7: Power supply and on / off switch are at the right side of the device

## 5.4 Check the Operation of the Device

### NOTICE

#### Damage to the turbo molecular pump due to jerking movements

Jerking movements can damage the running turbo molecular pump.

- ▶ Avoid any jerking movements or vibrations to the instrument during operation and for up to 1 minute after switching off.

Do not switch on the device when the ambient temperature is less than 10 °C.

✓ A DN 25 KF blank flange is available (if not already installed on the inlet flange).

✓ A helium calibration leak is available (optional).

- 1 Check if the inlet is blank flanged. If this is not so, flange a blank flange with an O-ring gasket on the inlet on the upper side of the device.
- 2 If your leak detector has an oil-sealed backing pump, connect an exhaust line at the exhaust port, see also Exhaust [▶ 24].
- 3 Connect the device to the mains supply.
- 4 Switch on the leak detector via the mains switch.
  - ⇒ After switching on pieces of status information are shown on the touchscreen about the speed of the turbo molecular pump, the foreline pressure, the emission and the active cathode. The start process takes about 3 minutes and is completed with a short acoustic signal. Now, the device is in "Standby" mode.
- 5 Press the Start button.
  - ⇒ The inlet is evacuated and then the measuring mode for the measured leak rate is shown. In case a test object was connected, you would start with spraying helium on the outside.
- 6 In case you would like to suppress any possible existing background signals (Helium background in the test object) press the ZERO button. In order to reverse the background suppression press the ZERO button on the control panel for 2 - 3 seconds, see "ZERO button [▶ 20]".
- 7 Press the STOP button.

- ⇒ The device switches to the mode "Standby".  
If you press the STOP button on the control panel for a few seconds the inlet of the device is ventilated.
- 8** If you want to finish the test now, turn off the device.
- 9** If you want to check the internal calibration wait, for getting a better quality of measurement results, 15 to 20 minutes until the device has warmed up.
- 10** To call the calibration menu press on the cross hair icon .
- 11** Select "Internal".
- 12** Press the  button.
- ⇒ The automatic internal calibration starts and requires approx. 30 seconds.
- 13** If you want to check the measurement accuracy of the device using the optional Helium calibration leak remove the blank flange from the inlet and connect an open Helium calibration leak onto the inlet.
- 14** Press the Start button.
- ⇒ The inlet is evacuated and the leak rate of the test object is measured and displayed.
- 15** Press the STOP button to interrupt the measurement.
- ⇒ The leak detector changes into the Standby mode.
- 16** Press the STOP button on the housing until the message STANDBY / VENTED appears on the display.
- ⇒ The inlet is now in the vented state.
- 17** Separate the Helium calibration leak from the inlet and flange the inlet blank again.
- 18** Switch off the device via the mains switch.

## 6 Operation

### 6.1 Switch ON

- ▶ To switch on the device, press the power button.
  - ⇒ When delivered the device shows the screen "Standby" after run-up.

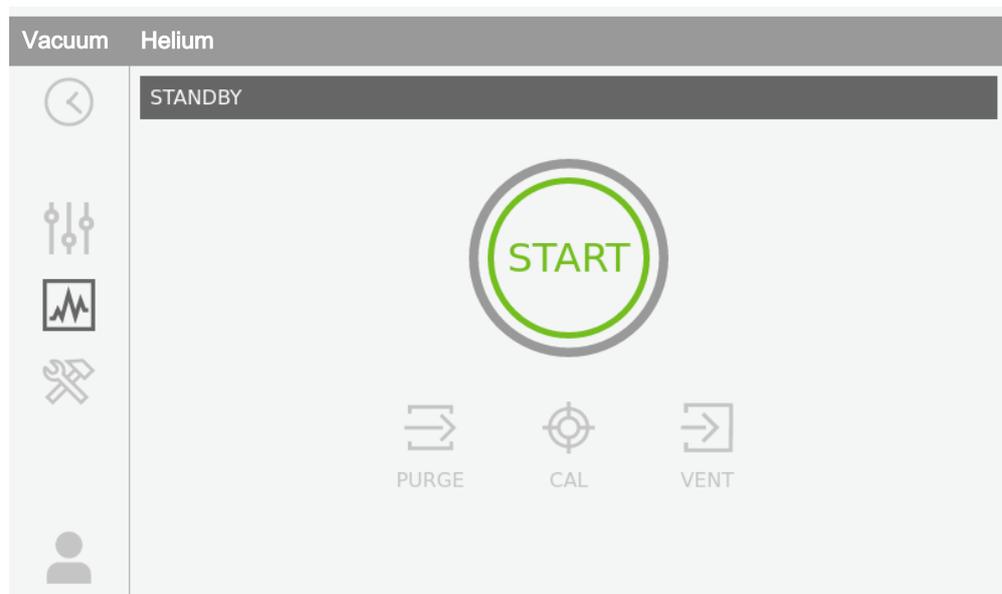


Fig. 8: Window "Standby"

	Starting the measurement		Calibrating
	Purging/gas ballast		Vent

### 6.2 Basic settings



You are able to save the actual settings of the device at any time, so that you can use them at a later time, see also "Saving and managing sets of parameters [▶ 75]".

#### 6.2.1 Set language on the user interface

When a user is created, a language is specified, see also "Select, modify, create user profile [▶ 41]".

In addition, as a user with limited rights, you can also change the language of the user interfaces, see also "Modify Personal Settings [▶ 42]".

## 6.2.2 Setting date, time and time zone

✓  **Supervisor** - rights

1  > Setup > General > Date and time

2 Set up.

3 Save .

Alternatively, press  in the upper window bar and make your settings.

## 6.2.3 User profile settings

### 6.2.3.1 Overview of Rights Groups

The rights of a user depend upon which group he belongs to.

#### User

Members of the group  **User** can

- perform measurements,
- view history of the measurement results,
- view device information,
- view error logs.

#### Operator

Members of the group  **Operator** have all the rights of the group **User**. Moreover, they can

- Create / modify / delete user,
- Export / delete measurement data,
- Modify measurement settings,

#### Supervisor

Members of the group  **Supervisor** have all the rights of groups **User** and **Operator**. Moreover, they can

- create / modify / delete operators,
- create / modify / delete supervisors,
- Perform software updates,
- modify date / time.

### 6.2.3.2 Select, modify, create user profile

✓   **Operator** or **Supervisor** rights

1  > User accounts

⇒ Existing users and associated groups are displayed in list form.

2 You have the following possibilities:

To create a new user profile, select  at the bottom of the window.

⇒ The window "User profile" opens.

Otherwise, press an already created user name and choose from the tool bar:

, to load a user profile.

⇒ The login window opens.

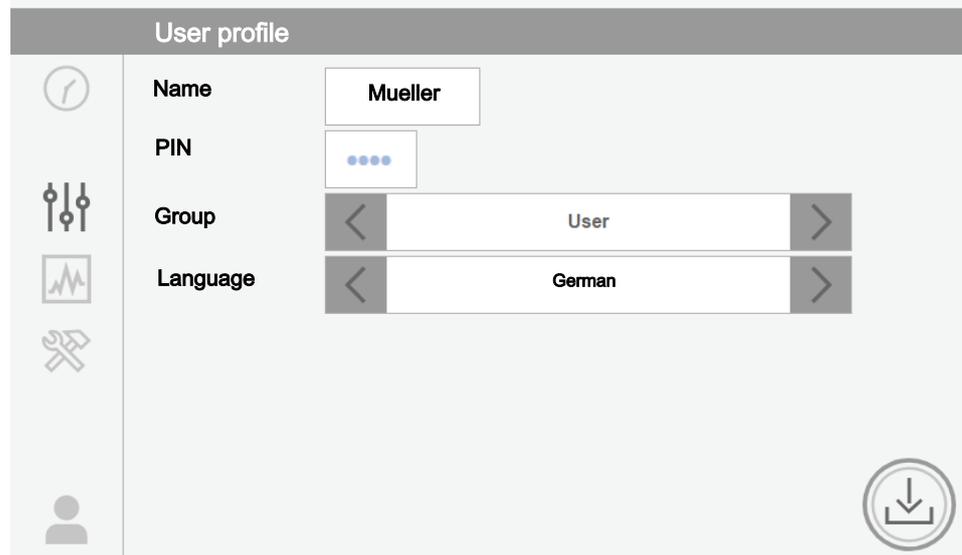
, to modify a user profile.

⇒ The window "User profile" opens.

, to delete a user profile.

⇒ A confirmation screen appears.

- 3** After selecting some tools, the "User profile" window opens. If this window opens, enter a user name, change it, or keep it as required.



User profile	
Name	Mueller
PIN	.....
Group	< User >
Language	< German >

- 4** If the "PIN" field is not filled in or you want to change the content, enter a 4-digit PIN.
- 5** To assign the required rights to the user, select a group. Via < and > select between the groups User, Operator and Supervisor. See "Overview of Rights Groups [▶ 41]".
- 6** In the "Language" field, assign a language from the selection list to the user via < and >.
- 7** Save .

### 6.2.3.3 Modify Personal Settings

As a user with limited rights (**User**) you can also modify your language or PIN. By this the associated user profile is correspondingly adapted. Access to the entire user profile is not necessary.

- 1 Press on your name which appears on the left of the display.  
Alternatively press “ > User accounts > Change own language“.
- ⇒ The window "User accounts" opens.
- 2 Select the “Change own PIN” or “Change own language” button as required.

## 6.2.4 Switch off Automatic Login



### Factory setting

As per factory settings, after switching on the device the user "Supervisor" automatically logs in and the measurement screen is called. This default user also has the permissions of the group "Supervisor". Without changing this setting, any user can operate all functions without restriction.

You can specify that the login window appears after you turn on the device instead of automatically logging on.

In the login window, all users can login, which have been already registered in the device, see "Select, modify, create user profile [[▶ 41](#)]”.

#### ✓ Supervisor - rights

- 1  > User accounts > Manage Automatic Login
- 2 In the “Manage Automatic Login” window, deactivate the option “Active”.
- 3 Save .

⇒ After restarting the device, the current settings are applied.

## 6.2.5 Switch on Automatic Login

You can specify if a user of your choice is automatically logged in after the device is switched on without the login window.

#### ✓ Supervisor - rights

✓ The requested user was already created. See "Select, modify, create user profile [[▶ 41](#)]”.

- 1  > User accounts > Manage Automatic Login
- 2 Enter the name of the user in the "Name" field. Note the uppercase / lowercase.
- 3 Enter the current PIN of the user profile in the "PIN" field.
- 4 In the window “Manage Automatic Login”, activate the option “Active”.
- 5 Save .

## 6.2.6 Presentation of the measurement screen



To switch between the different diagram presentation press  on the measurement screen, see "Assembly of the touchscreen [▶ 22]".

You can select between the following presentations:

- Line graph
- Bar graph

You can further configure the different diagram presentations. See "Changing the presentation of the line graph [▶ 44]" and "Changing the presentation of the bar graph [▶ 45]".

### 6.2.6.1 Changing the presentation of the line graph

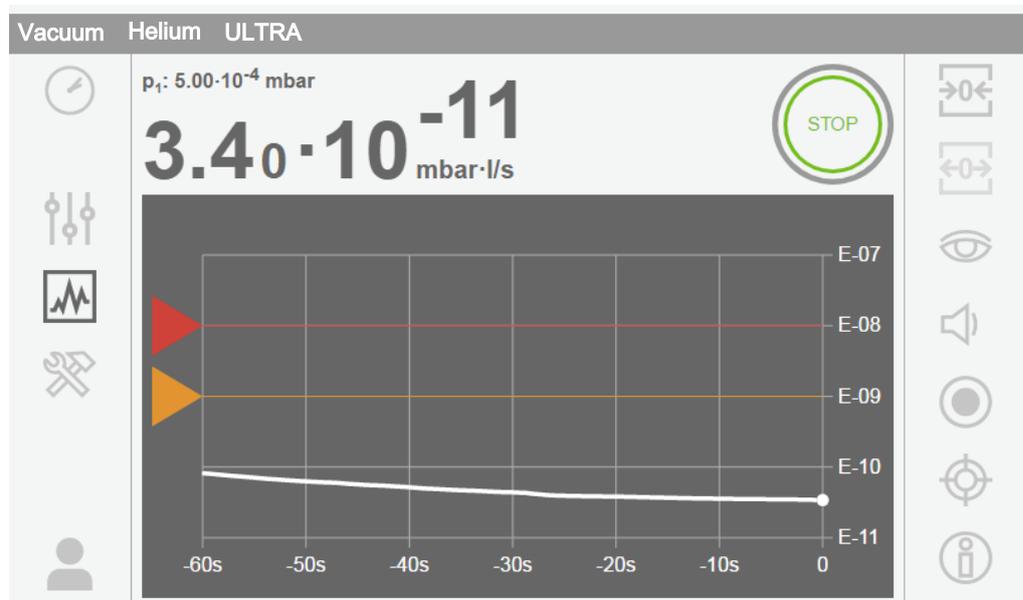


Fig. 9: Presentation of the line graph

✓  **Operator** or **Supervisor** rights

- 1  > Display > Line graph
- 2 In the field "Scaling" select between "Linear" and "Logarithmic".
- 3 Select between the different viewable "Decades".
- 4 To dynamically adjust the upper and lower limit on the leak rate, activate the option "Autoscale".
- 5 In the field "Time axis" select the length of the time axis "30", "60", "90", "120" or "240" seconds.
- 6 If the option "Autoscale" is not active, select "Lower diagram limit" in the field the desired decade.

7 Save .

### 6.2.6.2 Changing the presentation of the bar graph

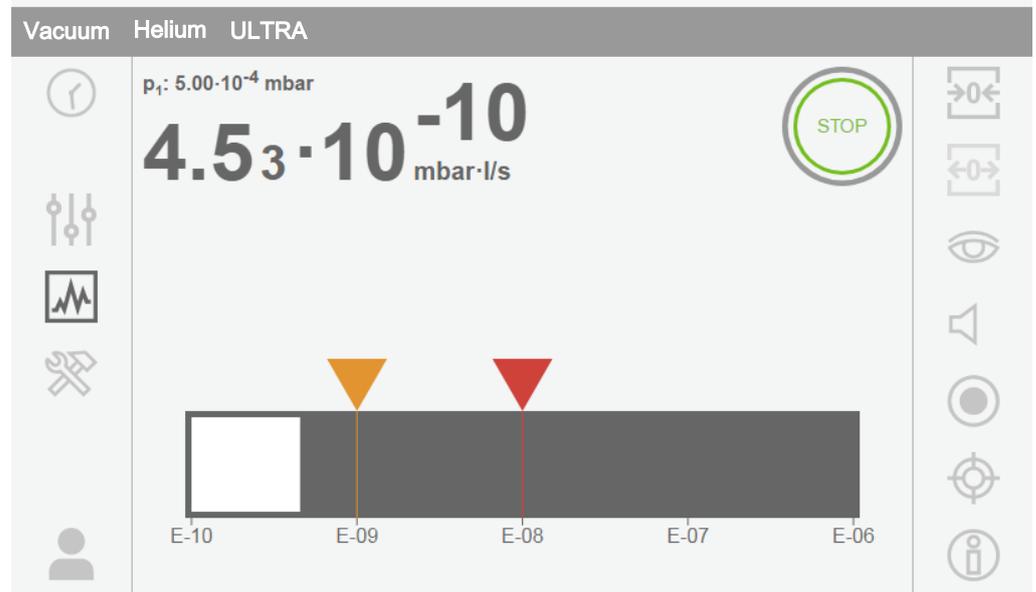


Fig. 10: Presentation as bar graph

✓   **Operator or Supervisor rights**

- 1  > Display > Bar graph
- 2 In the field "Scaling" select between "Linear" and "Logarithmic".
- 3 Select between the different viewable "Decades".
- 4 To dynamically adjust the upper and lower limit on the leak rate, activate the option "Autoscale".
- 5 If the option "Autoscale" is not active, select "Lower diagram limit" in the field the desired decade.
- 6 Save .

### 6.2.6.3 Change general display settings

✓   **Operator or Supervisor rights**

- 1  > Display > General display settings
- 2 If very small leak rates are of no interest to your application and you want to raise the lower leak rate limit, select between 1 to 6 decades in the "Raise lower leak rate limit". Raising the lower leak rate limit can facilitate the assessment of the leak rate display.
- 3 To set which information about the internal background should be displayed in the "Standby" window, make your selection under "Display background in standby".

The internal background is created from the remaining gas, which has not yet

been pumped out. Under normal conditions there is a background of  $1 \times 10^{-10}$  mbar l/s or  $1 \times 10^{-9}$  mbar l/s. For the mathematical treatment of the internal background, see "Change background suppression [▶ 59]".

Choices are:

- ⇒ "Status": As soon as the background value has stabilized, "background stable" is displayed.
- ⇒ "Leak rate": The numerical value of the background display is displayed. As soon as the background value has stabilized, the representation of the numerical value changes from light to dark.
- ⇒ "Expert": The measured currents are displayed.
- ⇒ "Off": The background display is off.

**4** Save .

## 6.2.7 Change units

You can choose between "Torr·l/s", "atm·cc/s", "Pa·m<sup>3</sup>/s", "sft<sup>3</sup>/yr" and "mbar·l/s" for vacuum operation.

After switching the operation mode "Sniffer" in addition to the modes mentioned above you can also select between the units "oz/yr", "g/a" and "ppm".

You can also choose between the following pressure units: "mbar", "Pa", "atm" and "Torr".

✓   **Operator or Supervisor rights**

**1**  > Setup > General > Units

**2** If necessary change the units of the "Leak rate unit vacuum", the "Leak rate unit sniff" and the "Pressure unit".

- ⇒ The option "Equal to display" is activated according to the factory settings so that the units for the interface can be shown exactly as the units of the device.

**3** In order to independently select the units of the interface deactivate the option "Equal to display".

- ⇒ Further fields to set the units of the interface are shown.

**4** To order to set the selected units so that they can also be used for the interface, activate the option "Equal to display".

**5** Save .

## 6.2.8 Change audio settings

In addition to the visual display of the measurement results you can change the settings to the volume, to the Notification beep and to the audio alarm.



## ⚠ WARNING

### Damage to the hearing due to loud audio

The alarm level of the device can exceed 85 dB(A).

- ▶ Adjust the volume accordingly.
- ▶ Only expose yourself a short time to the alarm.
- ▶ Use hearing protection.

### ✓ 👤 Operator or Supervisor rights

#### 1 🔊 > Audio

- 2 In order to change the volume of the audio alarm and the notification sounds, select the desired "Volume". Do not fall below the set value for the "Minimum volume" in the next field.

⇒ Setting range: 0 ... 15

⇒ You can listen to the set volume using the "Test" button.

- 3 If necessary, change the minimum volume.

⇒ The "Minimum volume" is the volume for the audible alarm which cannot be undershot. If you select a value greater than 0, the lowest volume level is shown on the measurement screen after pressing the volume icon. This allows you to prevent a non-authorized person from setting a value that is below the ambient noise level.

⇒ Setting range: 0 ... 15

- 4 If you want to define the cause of an alarm or the type of notification beep more accurately, then make your selection with the "Audio alarm mode" between "Leak rate proportional", "PINPOINT", "SETPOINT", "TRIGGER" and "Off".

⇒ "Leak rate proportional": The frequency of the audible signal is proportional to the bar graph display or diagram height. The frequency range is 300 Hz to 3300 Hz.

⇒ "PINPOINT": The sound of the acoustic signal changes its frequency within a specific range of leak rates. This range extends from a decade below the selected setpoint value to a decade above. Below this leak rate range, the sound is constantly low, above the sound is constantly high.

⇒ "SETPOINT": The pitch is proportional to the leak rate. The signal sounds if the leak rate exceeds the set setpoint 1. See also "Setting setpoints [▶ 52]".

⇒ "TRIGGER": If the set setpoint 1 is exceeded, then a two-pitch signal is issued. See also "Setting setpoints [▶ 52]".

- 5 If you want to suppress the alarm for some time after pressing the Start button, then set "Audio alarm delay". For example: Time period during the pump down of a test chamber system.

- ⇒ After pressing the Start button the audible signal is activated as soon as the leak rate falls below the setpoint value 1 or the alarm delay time expires. This setting is only for the audible alarm type "Setpoint" and "TRIGGER".
- 6 If you wish to have notification beeps, activate the option "Notification beep".
- 7 Save .

## 6.2.9 Change the protection settings

You can protect the device from Helium contamination with gross leaks and from the penetration of particles. Furthermore, you can change the maximum evacuation time.

### ✓ Supervisor - rights

- 1  > Setup > Measurement > Protection
- 2 If you want to switch-on the gross leak protection, activate the option "Gross leak protection" and set under "Gross leak protection limit" a shut-down threshold.
  - ⇒ The device closes the inlet valve as soon as the measured leak rate exceeds the shut-down threshold. This will prevent an excess amount of helium from entering the mass spectrometer. Consequently, the leak detector is prevented from becoming contaminated by Helium. The helium entering the specimen can be pumped out using an external pump. If no external pump is being used, we recommend that the test object is vented before continuing with the measurement.
- 3 If you want to prevent particles from being sucked into the device make sure that the test object is first pumped down with another parallel running pump. Activate the option "Particle protection" additionally.
  - ⇒ The leak detector only starts with the pump down once the inlet pressure has fallen below 1 mbar.
- 4 To change the maximum evacuation time after a gross leak is detected, enter the desired time in seconds under "Max. evacuation time gross leak".
  - ⇒ This setting determines when a gross leak warning message is signaled. The factory setting is 600 s. If the inlet pressure does not drop below 100 mbar within this time span, a fault message is signaled. This menu point is especially useful with series tests that always have the same test conditions. After pressing the Start button the specimen is evacuated. If the corresponding pressure conditions ( $p_1 < 100$  mbar) is not reached within the time that is to be set here or falls below, the pump down process is aborted and a warning message appears in the display.
 

The time that is to be selected depends on the one hand on the desired reaction time for the gross leak message and on the other hand on the volume of the test object and from the effective pumping speed.

If the pump down process should not be aborted enter "0". This corresponds to the entry "infinitely".

- 5 To change the maximum evacuation time before the measurement, enter the desired time in seconds under "Max. evacuation time until measurement". The "evacuation time until measurement" is about the time until the first approved measurement range is reached. The factory setting is 1800 s.
  - ⇒ If the anticipated pressure conditions are not reached during the evacuation time, a warning message is shown after the expiration of the evacuation time. For the pressure conditions, see also the following setting options:
    - 🔧 > Setup > Measurement > Pressure limits
    - and
    - 🔧 > Setup > Measurement > Vacuum > Vacuum ranges
- 6 Save .

#### See also

-  Activate vacuum ranges [[▶ 53](#)]

## 6.2.10 Set maintenance interval "Filter sniffer tip" or "Air filter"

To adjust the maintenance interval to the degree of contamination at the location of the device, you can choose between a default value or a self-selected maintenance interval.

✓  **Supervisor** - rights

- 1 🔧 > Setup > Maintenance counters
- 2 Set up.
  - ⇒ Enter a value of your choice in hours for the "Filter sniffer tip" or press the adjacent "Default value" button (1000 hours).
  - ⇒ Enter a value of your choice in hours for the "Air filter" or press the adjacent "Default value" button (2500 hours).
- 3 Save .

#### See also

-  Change the filter mat of the fan input [[▶ 95](#)]
-  Replacing the SL300 sniffer line filter [[▶ 97](#)]

## 6.2.11 Activate or deactivate maintenance requests

Enables or disables warnings when the time for maintenance is exceeded. The time until the next maintenance is displayed.

✓  **Supervisor** - rights

- 1 🔧 > Setup > Maintenance requests

- ⇒ In the “Enable/disable maintenance requests” window, you can activate or deactivate the maintenance requests for the following modules:
  - Calibration leak
  - TMP
  - Filter sniffer tip
  - backing pump
  - Exhaust filter
  - Air filter
- 2** Set up.
- 3** Save .

## 6.2.12 Modify Other Settings

- You can set whether you need to be notified for calibrations or not. The factory setting is "OFF".
  - Furthermore, you can, for safety reasons for example, set whether the device is only to be operated via the touchscreen and not via the buttons on the control panel or via the remote control. The factory settings for the "Local operation" is activated and allows all operating possibilities.
- ✓   **Operator or Supervisor rights**
- 1**  > Setup > Measurement > Miscellaneous
  - 2** If you want to switch-on the calibration request, activate the option "Calibration request".
    - ⇒ If this option is switched-on there is a corresponding message 30 minutes after switched-on or when the temperature of the device has changed by more than 5 °C since the last calibration.
  - 3** Under “Local control“ you make your choice in the selection field between:
    - ⇒ Released.  
All operating options are switched on.
    - ⇒ Release after login.  
The Start, STOP and ZERO button on the control panel can be operated after logging in.
    - ⇒ Closed.  
The device can only be operated via the touchscreen. The Start, STOP and ZERO buttons on the control panel are locked. The buttons of the remote control can also not be used.
  - 4** Save .

## 6.2.13 Use favorites

To shorten the time spent searching menus for frequently used functions, create freely assignable menu keys in the "Favorites" window.

### Use Favorites:

▶ Press the icon with your permission , ,  and then the "Favorites" button

or choose alternatively

▶  > User accounts > Favorites

⇒ The Favorites window with 9 buttons is displayed. Assigned buttons can be used to quickly call up desired functions.

### Create Favorites:

1 Press an empty button.

2 Select the desired menu name from the displayed list overview and confirm your selection with .

⇒ Alternatively, you can press  in the "Favorites" window, mark an empty or occupied entry and select the desired menu name from the list overview using the  shown.

### Change Favorites:

1 In the Favorites window, press .

⇒ This opens the "Manage" window in which you can tap the desired entry.

⇒ The icon  is displayed.

2 After pressing this icon, the list overview is displayed with the menu names from which you make your selection and save it by pressing .

## 6.3 Settings for the measurements

### 6.3.1 Select operation mode

✓   **Operator** or **Supervisor** rights

1  > Operation mode

2 Select between "Vacuum" and "sniffing / SL300".

⇒ If you want to use the "QT100" accessory, select the "Sniff / SL300" operation mode.

⇒ If you want to use the "SL301" Sniffer line, select the "Sniffer line / SL300" operation mode.

3 Save .

### 6.3.2 Select gas



#### **DANGER**

#### **Danger from a Hydrogen explosion**

Hydrogen can explode in combination with oxygen. The allowable composition of venal gas mixtures can be read in the safety data sheets of the respective manufacturers.

► Ensure that the share of hydrogen does not exceed the described concentration.

✓  **Supervisor** - rights

1  > Setup > Measurement > Mass

2 Make a selection from:

"Hydrogen"  $H_2$  (2 amu)

"Helium"  $^4He$  (4 amu)

"Mass 3"  $^3He$  (3 amu)

3 Save .

### 6.3.3 Setting setpoints

You can set the leak rate for the setpoint to 1, 2, 3 and 4 separately.

Setpoints 1 and 2 are typically used as warning and reject limits. Setpoints 3 and 4 are not shown in the display. All 4 setpoints can be used via the I/O Interface, see also the interface description.

When the setpoints are exceeded:

- If the setpoint 1 or 2 is exceeded, the measurement line in the measurement window changes color.
- The setpoint relay of the digital output switches, see also "IO Interface [▶ 105]" or the interface description.

Also setpoint 1 defines the trigger point for the different alarms, see also "Change audio settings [▶ 46]". It is also the limit for SMART, see "Set and use the function ZERO [▶ 56]".

✓   **Operator** or **Supervisor** rights

- 1  > Setpoints
- 2 Set up.
- 3 Save .

### 6.3.4 Activate vacuum ranges

#### Vacuum ranges

You can activate the vacuum ranges GROSS, FINE and ULTRA for your measurements.

All 3 areas can be activated at the same time. If several areas are activated, they switch automatically depending on the inlet pressure. In this way different sensitivities can be measured with.

At least one range must be activated.



#### Large pressure fluctuations

If large pressure fluctuations are to be expected during measurement, it may be useful to deactivate the ULTRA vacuum range.

The turbo molecular pump is thus better protected against sudden large pressure rises.

Note, however, that this reduces the maximum pumping speed and the minimum detectable leak rate of the leak detector.

✓   **Operator** or **Supervisor** rights

- 1  > Setup > Measurement > Vacuum
- 2 Activate the desired vacuum range under "Vacuum range".
- 3 Save .

### 6.3.5 Setting the machine factor

If you are measuring in the operation mode "Vacuum" and using an external pump in parallel, the measured leak rate would be too small in comparison to the leak rate based on an internal calibration.

If you would like to compensate for this you can multiply the measured leak rate with the suitable machine factor and then have the value shown.

When taking into consideration the Helium pumping speed of the device, the machine factor can also be estimated. The measurement of the leak rate is more accurate using an external calibration leak with the test object - once with the external pump switched and once without. The machine factor then results from the quotient of the calculated calibration factors.

The machine factor can also be used to correct the leak rate display with respect to the air equivalence. The machine factor for this correction is 0.37.



### Using Quicktest QT100

The Quicktest QT100 is available as an accessory. For more information see "Accessories and spare parts" or the operating instructions for the QUICKTEST QT100.

If you are measuring in the operation mode "Sniffer" and have a Quicktest QT100 connected to the inlet, the measured leak rates would be too small compared to leak rates based on internal calibration. For the Quicktest QT100 a machine factor of approx. 400 has to be set. In addition, the pressure limits for flow monitoring must be adjusted, see "Change the sniffer line pressure monitoring [▶ 60]".

To obtain accurate results based on an internal calibration, it is necessary to adjust this factor by means of an external calibration leak. For this, calibrate both with an external and the internal calibration leak and note the determined calibration factors in each case.

The new machine factor results from the following formula:

$$(\text{Old machine factor}) * (\text{External calibration factor}) / (\text{Internal calibration factor})$$

Calibrate again after adjusting the machine factor!

✓   **Operator or Supervisor** rights

1  > Setup > Measurement > Calibration leak

⇒ The field "Machine factor helium" is shown.

2 Set up.

3 Save .

⇒ If the machine factor is not "1", the letters "COR" in the measuring screen indicate the changed machine factor (correction factor).

## 6.3.6 Set external calibration leak

To use an external calibration leak for calibration, enter the leak rate of the calibration leak.

✓  **Operator** or **Supervisor** rights

1  > Setup > Measurement > Calibration leak

2 Adopt the printed value and the associated unit from the calibration leak or certificate.

Do not change the combination of the printed value and associated unit, even if your device is otherwise set to other units!

3 Save .

**See also**

 External calibration [[▶ 63](#)]

## 6.3.7 Change pressure limits

Pressure limits for the vacuum mode.

With this function the factory-set switching points between the vacuum ranges GROSS, FINE and ULTRA can be changed. This can be necessary if the device is pumped down with gases other than air, such as Argon. The reason for this is the gas type dependence of the internal Pirani pressure gauges.

By changing the preset switching point this can be compensated for. The pressure signal of the gas type dependent inlet pressure indicator (Pirani) can deliver different switching values after the adjustment of the sequence control of the device.

In addition, when using the partial flow system, the changeover pressure from GLIMPSE to P-GROSS can be adapted to the connected vacuum system (partial flow pump, hose lengths, volume of the test object). See also "Set and use external partial flow system [[▶ 61](#)]".

### NOTICE

#### Incorrectly set pressure limits

Incorrectly set pressure limits can have a negative effect on the turbo molecular pump or the ion source. In addition to increased wear of these components, the turbo molecular pump or ion source can also be switched off.

✓  **Supervisor** - rights

1  > Setup > Measurement > Pressure limits

⇒ You can change the named pressure limits. Preset values see "Factory settings [[▶ 30](#)]".

EVAC -> GROSS (factory setting 15 mbar)

GROSS -> FINE (factory setting 2 mbar)  
 FINE -> ULTRA (factory setting 0.3 mbar)  
 GLIMPSE -> P-GROSS (factory setting 0.004 mbar)

## 2 Set up.

⇒ If argon is pumped with the device, the following settings, which deviate from the factory settings, must be used for error-free operation:

EVAC -> GROSS: 4 mbar  
 GROSS -> FINE: 1 mbar  
 FINE -> ULTRA: 0.2 mbar

## 3 Save .

### 6.3.8 Set and use the function ZERO

#### Why should I use ZERO?

To be able to clearly measure small leakages the function ZERO should be used.

With each leak detection there is a "Background signal" (see "Definition of terms [▶ 8]") that disrupts the search or the measurement of leakages.

- To hide the background signal, activate the function ZERO.
- For the measurement of very small leaks, e.g. in the -11 range, press the ZERO button a few minutes before opening the calibration leak!
- You can also use ZERO to hide a currently displayed leakage, which interferes with searches for other or even smaller leaks.



#### A currently displayed leak is hidden through ZERO.

By using the function ZERO not only is the background signal hidden, but also the representation of a current leak.

- ▶ Only activate the ZERO function, if a leak is not measured at the same time. The ZERO function should be activated before the tracer gas is used.

#### Activate or deactivate ZERO

ZERO is activated by factory settings.

✓  **Supervisor** - rights

1  > Setup > Measurement > ZERO and filter

2 If necessary change "ZERO mode". The factory settings is "SMART".

⇒ Effect of SMART: The ZERO function remains blocked until the background decreases sufficiently slowly so that a leak the size of setpoint 1 can be measured. As soon as the function ZERO is unblocked it is shown in the status display by "Stable".

- ⇒ Effect of ZERO: When you press the ZERO button, the current leak rate value is set to the lower display limit. Note: The Zero button should not be pressed when there is a rapidly falling background, otherwise, when compared to the background change, small leak rate signals may be incorrectly hidden.
- ⇒ Effect of ZERO with ULTRA: The setting automatically activates the ZERO function "ZERO", as soon as the ULTRA measurement range is reached the first time after pressing the START button and the leak rate has been fallen below setpoint 3.
- ⇒ If you select "OFF", the ZERO button does not work.

**3** Save .

- ⇒ If ZERO is activated, start the function by pressing the ZERO button. See also "ZERO button [▶ 20]".

**How do I switch on the selected ZERO function?** Briefly press the ZERO button on the control panel or the touchscreen . Through it the current leak rate value is set to the lower display limit.

**How do I switch off the ZERO function?** Press the ZERO button on the control panel for more than 2 seconds or on the touchscreen .

### 6.3.9 Vent, Purge/Gas ballast, Regenerate

**Vent** In measuring mode, you use this function to vent the inlet of the device and a test specimen connected to it after a measurement. Without the suction effect of the vacuum, a test specimen can be easily changed.

Under "Vent mode" you have the choice between "Immediate", "No ventilation" and "Manual". If "Immediate" is activated, the ventilation is triggered when changing to Standby. If "manually" is activated the ventilation is only triggered after a prolonged pressure on the button STOP or by pressing at  in the window "Standby".

The inlet area of the leak detector is vented when switched off.

✓   **Operator** or **Supervisor** rights

- 1  > Setup > Measurement > Vacuum
- 2 Set up.
- 3 Save .

**Purge/Gas ballast** By activating the purging function (with dry backing pumps) or the gas ballast function (with oil-sealed backing pumps), a small gas flow is introduced into the backing pump in the "Standby" state. The function may be useful to remove condensed water vapor from the pump chamber of the backing pump or to reduce the helium background.



## ⚠ WARNING

### Risk of suffocation due to nitrogen or argon as purge gas

The use of nitrogen or argon as purge gas may cause suffocation at high concentrations in indoor air.

- ▶ Take precautions to avoid high concentrations of these gases in enclosed spaces.

If an oil-sealed backing pump is installed in your leak detector, you can set whether to purge automatically for 20 seconds when switching to "Standby".

✓ 👤 👤 **Operator** or **Supervisor** rights

✓ An oil-sealed backing pump is installed in your leak detector.

1 🏠 > Setup > Measurement > Vacuum

2 If necessary activate or deactivate the option "Automatic purge".

⇒ If you switch off the automatic purging, you can switch purging on or off in the standby window by pressing .

3 Save .

## Regeneration

It may happen that too much helium has entered the interior of the device and no accurate measurements are possible (helium contamination). The regeneration provides the user with an automatic start-stop-vent cycle to degrade such elevated helium background.

An active regeneration is shown in the display.

Regeneration is automatically deactivated after 60 minutes.

✓ 👤 👤 **Operator** or **Supervisor** rights

✓ You did not enable the "no vent" setting under "Vent mode", see above.

▶ 🌀 > Regeneration

⇒ You can start the regeneration in the opened window and stop it as desired or wait for the automatic deactivation of the regeneration after 60 minutes.

## 6.3.10 Change leak rate filter

The leak rate filter "AUTO" is preset. AUTO ensures that the averaging time is optimally adapted to the leak rate range.

Signals are averaged in optimized time intervals, based on the respective leak rate range. In addition, disturbance peaks are eliminated, which are unrelated to the leak rate signals and provides unusually short response times even with low leakage rate signals. The algorithm used offers excellent sensitivity and response time.

With the leak rate filter "Fixed" there is also a filter with a fixed time constant available.

## Procedure

✓ 👤 **Supervisor** - rights

- 1  > Setup > Measurement > ZERO and filter
- 2 Make a selection between "AUTO" and "Fixed" under "Leakage rate filter".
- 3 Save .

### 6.3.11 Change background suppression

The internal background suppression is preset.

The measurement system of the leak detector contains a residual amount of helium and hydrogen even without connection to a test chamber. This creates an internal measurement signal component already before pressing the Start button.

After activating "Background suppression" the internal background and selectably also the background in the inlet area is deducted from the leak rate. This happens after pressing the Start button automatically.

✓  **Supervisor** - rights

- 1  > Setup > Measurement > ZERO and filter
- 2 Make your selection in the field "Background suppression" between "Internal only", "Inlet area" and "Switched off".

⇒ Internal only

Factory setting. With every measurement the internal measurement signal component of the device is deducted by pressing the Start button. The accuracy of the measurement results are no longer impaired by the internal background.

At the time of pressing the button Start:

In order to determine a new internal background, the leak detector must be in standby mode for at least 20 seconds and the flushing or gas ballast valve must not have been open during this time. If you want to ensure that a current internal background is used in the following measuring mode, do not press Start until the numerical value of the background display has changed from light gray (grayed out) to dark gray in standby mode. To make the background display visible in standby mode, activate the corresponding function, see "Change general display settings [▶ 45]".

⇒ Inlet area

Additionally to the deduction of the internal background, pressing Start with every measurement also deducts the background of the inlet area.

If you would like to switch this on, make sure that the background of the inlet area is determined, see "Determine the background of the inlet area [▶ 60]".

We recommend that the calculation of the inlet area background is occasionally repeated, because the device pumps down any background present in the inlet area after a certain time.

⇒ Switched off

No background suppression.

---

### 3 Save .

---



#### High background value

If the actual background is higher than  $1 \times 10^{-8}$  mbar l/s, it can no longer be automatically deducted. The high background must be pumped down in this case.

---

#### 6.3.11.1 Determine the background of the inlet area

This function determines the value of the internal Helium background.

If "Zero and Filter" are shown in the window under background suppression with value "Inlet area" selected, this value is then deducted from the measured signal when Start is pressed. See also "Change background suppression [▶ 59]".

- ✓ Inlet blank flange
- ✓ Operation mode Vacuum Mode
- ✓ The device is in the state "Standby" or "Measure".

- 1 Select the cross-hair icon .
- 2 Select "Calibration Eingang Hintergrund".
- 3 To start the automatic determination of the intake background, press .

#### 6.3.12 Change the sniffer line pressure monitoring

In the operation mode Sniffing (SL300) automatic pressure monitoring is activated.

The preset pressure limits define a maximum and a minimum inlet pressure. If the pressure does not lie within these limits then generally the caliper is either blocked or broken. Fault messages are issued according to the following rules:

Inlet pressure > Upper limit: Caliper defective.

Inlet pressure < Lower limit: Gas flow is too low through the caliper (blocked caliper).



#### Using Quicktest QT100, see also "Accessories and spare parts".

When using the QT100, these limits must be adjusted! The limit values may vary considerably in individual cases.

Therefore, first set the following values for the QT100:

Pressure capillary blocked: 0.002 mbar

Pressure capillary broken: 0.01 mbar

Then check whether the pressure "p1" in measuring mode lies centrally between these values. If not, adjust the values accordingly.

---

- ✓  Supervisor - rights

- 1  > Setup > Measurement > Sniff > Capillary surveillance
  - ⇒ You can change the following settings, to view the preset values see "Factory settings [▶ 30]".
    - "Pressure SL300 capillary blocked" (lower limit)
    - "Pressure SL300 capillary broken" (upper limit)
- 2 Set up.
- 3 Save .

### 6.3.13 Set and use external partial flow system

In partial flow operation, the test object is additionally evacuated with another pump. We recommend using the Leybold partial flow system (Cat. No. 14020), see "Accessories and spare parts".

As an alternative to the partial flow system mentioned above, you can connect an external auxiliary pump via a T-piece. In this case, however, the leak detector is not ready to measure from 1000 mbar.

#### Connect partial flow system to the leak detector

- ✓ You have a partial flow system (Cat. No. 14020).
  - 1 Connect the angle valve of the partial flow valve block with the vacuum hose to the inlet flange of the leak detector.
  - 2 Connect the control cable to the "ACCESSORIES" connector block, see "Connections for accessories and control signals [▶ 26]".

Further detailed information can be found in the operating instructions for the partial flow system.

#### Configure partial flow system

- ✓   Operator or Supervisor rights
  - 1  > Setup > Measurement > Partial flow
  - 2 Under "Pumping speed", enter the air pumping speed of the external partial flow pump in m<sup>3</sup>/h.
  - 3 If required, enter a period in seconds under "Quick pump time".
 

The "Quick pump time" determines how long valve V10 is open in the partial flow valve block. A detailed description can be found in the operating manual for the partial flow system.

At "0" seconds, valve V10 will not be opened at Start. We recommend this value if you want to reduce the entry of particles into the leak detector or need a leak rate display with reduced sensitivity immediately after Start.

A setting of "60000" or greater corresponds to "infinite". The valve V10 is

opened at Start. At an inlet pressure  $p_1 < 15$  mbar, the leak detector starts measuring operation and indicates leak rates with the highest possible sensitivity. This setting is recommended if it is acceptable to wait a while to reach the measuring mode and a leak rate reading is not necessary before.

During a "Quick pump time" between 0 seconds and "infinite", the leak detector attempts to reach an inlet pressure  $< 15$  mbar with V10 open during this time. After this time, the valve V10 is closed and the leak detector switches to measuring mode (helium or hydrogen enters the device via the panel of the valve block).

- 4 If necessary activate the option "Bypass Valve Automatic close".  
This setting defines the behavior of the bypass valve in the partial flow system. When this option is activated, the bypass valve closes depending on the inlet pressure. This allows more sensitive measurements at low inlet pressure. If this option is not activated, the bypass valve will always remain open, even if the inlet pressure is low enough. This always causes the maximum pumping speed at the inlet.
- 5 Turn on the partial flow system by activating the "Enabled" option or off by deactivating this option.
  - ⇒ If partial flow is activated, you can switch between the display of the leak detector ("PHOENIX" button) and the display of the partial flow ("Partial flow" button) in the vacuum diagram. See "View vacuum diagram [▶ 79]".



With activated partial flow, the leak detector has up to four additional measurement ranges in addition to the usual measurement ranges (GROSS, FINE and ULTRA). These are:

#### GLIMPSE

The test specimen is evacuated via the partial flow pump (V8ext is open) and the leak detector measures via the orifice in the partial flow valve block. The switching pressure P-GROSS can be adjusted "Change pressure limits [▶ 55]".

#### P-GROSS

stands for "Partial GROSS". The measuring range is identical to the GROSS, measurement range, but the test specimen is additionally evacuated via the partial flow pump (V8ext and V10ext are open).

#### P-FINE

stands for "Partial FINE". The measuring range is identical to the FINE, measurement range, but the test specimen is additionally evacuated via the partial flow pump (V8ext and V10ext are open).

#### P-ULTRA

stands for "Partial ULTRA". The measuring range is identical to the ULTRA, measurement range, but the test specimen is additionally evacuated via the partial flow pump (V8ext and V10ext are open).

---

**See also**

 [Setting the machine factor \[▶ 53\]](#)

## 6.3.14 Calibrating

In order to be able to measure leak rates correctly, the leak detector has to be adjusted at regular intervals by calibration. The mass spectrometer is tuned automatically.

You can perform the calibration using the device internal calibration leak or use an external calibration leak. Normally calibration should take place on a daily basis or if there is some doubt as to the measurement ability of the device.



- ▶ When using hydrogen or helium-3 ( $^3\text{He}$ ) as tracer gas an internal calibration is not possible. In this case use an external calibration leak.
- ▶ The operation modes Vacuum and Sniffer must be separately calibrated when using an external calibration.
- ▶ A calibration should only take place when the device is at operating temperature. Calibrate at least 20 minutes after switch-on.
- ▶ For systems with a greater distance to the test object, we recommend the use of an external calibration leak at the location of the test object.
- ▶ When using the internal calibration leak, observe the setting of the machine factor, see also “Setting the machine factor [▶ 53]”.

### 6.3.14.1 Internal calibration

- ✓   **Operator** or **Supervisor** rights
- ✓ The device is in the state "Standby" or "Measure".
  - 1 Select the cross-hair icon .
  - 2 Select "Internal".
  - 3 Press .
- ⇒ The device performs an internal calibration.

### 6.3.14.2 External calibration

- ✓   **Operator** or **Supervisor** rights
- 1 Mount the calibration leak on the inlet of the device.
- 2  > Setup > Measurement > Calibration leak
- 3 Adjust the leak rate of the calibration leak used, see also “Set external calibration leak [▶ 54]”.
- 4 Place the device in the state "Standby" or "Measure".

- 5 Press the cross-hair icon .
- 6 Select "External".
- 7 Press .
- 8 Follow the instructions on the screen.

### 6.3.14.3 Calibrate with air helium (sniffer operation)

In the lower layers of the Earth's atmosphere, the air contains about 5.2 ppm helium (volume fraction).

This helium concentration can be used to calibrate the leak detector in sniffer mode.



#### The calibration method described here is inaccurate!

- ▶ For optimum accuracy, always use the internal calibration leak or an external, calibrated calibration leak.

- 1 Connect the SL300 sniffer line and configure the leak detector as follows:  
Sniffer operation mode
  - Mass 4 (helium)
  - leak rate unit ppm
  - External calibration leak: 5.2 ppm
- 2 Select the calibration type "external without zero point measurement" and start the calibration procedure.
- 3 Only sniff normal ambient air if the leak detector prompts you to hold the sniffer to the external calibration leak. Make sure that the room air does not contain any additional helium, e.g. by using helium spray guns.
- 4 Confirm the measured value with .

### 6.3.14.4 Check calibration

The calibration can also be checked without changing calibration factor. This tells you whether a new calibration is necessary.

- ✓  User rights
- ✓ The device is in "Standby" or "Measure" mode.
  - 1 Select the cross-hair icon .
  - 2 Select "Proof".
    - ⇒ The check is started and the calibration factor is recalculated.
    - ⇒ The newly calculated calibration factor is displayed.
    - ⇒ If the newly calculated calibration factor deviates considerably from the stored calibration factor, a prompt for new calibration is displayed.

### 6.3.14.5 Measure internal calibration leak

- ✓  User rights
  - ✓ The device is in "Standby" or "Measure" mode.
    - 1 Select the cross-hair icon .
    - 2 Select "Measure internal calibration leak".
    - 3 Press .
- ⇒ The calibration leak is opened, the measured leak rate is displayed and compared with the target value.



Matching of the measured value of the internal calibration leak and the default value of the internal calibration leak does not mean that the measuring system is absolutely accurate if the internal calibration leak was used for calibrating the leak detector. See also "Setting the machine factor [▶ 53]".

---

## 6.4 Measuring

- ✓ The inlet flange on the upper side of the device is prepared for the pending measurement. This is usually where your test specimen or the SL300 / SL301 sniffer line or a blind flange is connected.
- ✓ If you have a device with an oil-sealed backing pump, there is an exhaust line at the exhaust port, see also "Exhaust".
- ✓ If you cannot exclude the entry of dirt particles, for example from the test specimen, you have taken suitable precautions to protect the detection system:
  - Use of a fine filter on centering ring for inlet flange (DN 25 KF, order number 88396)
  - Use of a partial flow system, see also "Set and use external partial flow system [▶ 61]".
- ✓ Possible alternatives to the operating possibilities on the device are set up (optional):  
IO interface, bus module, remote control, LAN or WLAN connection to notebook or tablet. Also see "Accessories and spare parts " and "Operate leak detector via web browser (wireless LAN) [▶ 113]".
  - 1 Switch on the leak detector via the mains switch.
  - 2 Make sure that the desired operation mode is set (see "Select operation mode [▶ 52]").
  - 3 Make sure that the correct basic settings and the settings for the current measurement are carried out. See "Basic settings [▶ 40]" and "Settings for the measurements [▶ 52]".
  - 4 Make sure that calibration takes place daily.  
When performing a calibration, note the 20 minute warm-up time. See "Calibrating [▶ 63]".
  - 5 In standby mode, initiate the measurement process by pressing the Start button.
    - ⇒ If you want to ensure that a current internal background is used in the following measuring operation, please observe the notes in chapter "Change background suppression [▶ 59]".
    - ⇒ Topic sniffing: The sniffer tip may touch the test object. If you want to test a weld seam or similar, you must guide the tip along the path at a speed of less than 2.5 cm/s. When you check a spot, hold the sniffer line to it for least 1 second.
  - 6 Keep track of the measurement results either as line, bar or circle graph, see "Presentation of the measurement screen [▶ 44]" and "Assembly of the touchscreen [▶ 22]".
  - 7 To display the maximum leak rate ( $Q_{\max}$ ) on the measurement screen during a measurement, press the Start button again. Also see "START button [▶ 19]" and "Assembly of the touchscreen [▶ 22]".

- 8 To measure small leak rates more easily, press the ZERO button when required, see "Set and use the function ZERO [▶ 56]".
  - ⇒ For the measurement of very small leaks, e.g. in the -11 range, press the ZERO button a few minutes before opening the calibration leak!
- 9 Record the measured values if necessary, see "Switch on data recording and configure export [▶ 67]" and "Assembly of the touchscreen [▶ 22]".
- 10 View or export recorded measurement cycles or measurement data. See also "Display measurement cycles [▶ 68]", "Display measurement data [▶ 68]" and "Export measurement data via network [▶ 70]".
- 11 Switch the instrument off.

#### See also

- 📖 Exhaust [▶ 24]
- 📖 Change general display settings [▶ 45]

## 6.5 Measurement data

You can record measured values in the internal database. The data recording can always take place or via the Start-Stop-Button. See also "Switch on data recording and configure export [▶ 67]".

You can view recorded measured values in graphically prepared form on the device display. You can also export the displayed measured values.

See also "Display measurement data [▶ 68]" or "Display measurement cycles [▶ 68]".

For the export you can either use a USB flash drive or the network connection, see also "Export measurement data via network [▶ 70]".

### 6.5.1 Switch on data recording and configure export

#### NOTICE

##### Reduces the service life of the memory

The recording of many measured values reduces the service life of the internal memory.

- ▶ Disable data recording when you no longer need it.

✓   **Operator** or **Supervisor** rights

1  > Setup > Data recording

2 To record immediately after starting the device, activate the option "Enabled".

- ⇒ This option is deactivated as standard. To start or stop a recording without activating this option press  in the measurement display.
- 3** Under "Export format" select between "CSV en", "CSV de" and "JSON".
  - ⇒ Standard is "CSV en".
    - For "CSV en", the column separator is a comma.
    - For "CSV de", the column separator is a semicolon.
    - "JSON" is a language-independent data format.
  - ⇒ Export files have a default name with timestamp and extension (e.g. icmeas20160720-082829.csv).
- 4** To export measurement data in addition to the measurement data, such as the serial number of the device, activate the "Export metadata" option.
  - ⇒ Note: If other data is exported in addition to measurement data, this can increase the effort required for data post-processing.
- 5** Save .

## 6.5.2 Display measurement cycles

The measurement cycle is the time between pressing the Start and STOP button. You can view the associated information including a chart and optionally edit 2 free text fields.

- 1**  > Measurement data > Measurement cycles
  - ⇒ Stored measurement cycles with ID, start and end time are displayed.
- 2** To view the details of a measurement cycle, select the desired entry by touching it and press .
  - ⇒ All information belonging to the measurement cycle and a chart are displayed.
- 3** To export the displayed cycle, connect a USB flash drive (FAT32 formatted) to the leak detector and press .
- 4** To edit text in the "Free text 1" and "Free text 2" fields, press .
  - ⇒ Alternatively, you can edit "Free text 1" and "Free text 2" from the "Measurement cycles" window. Select an entry by tapping on it and press .

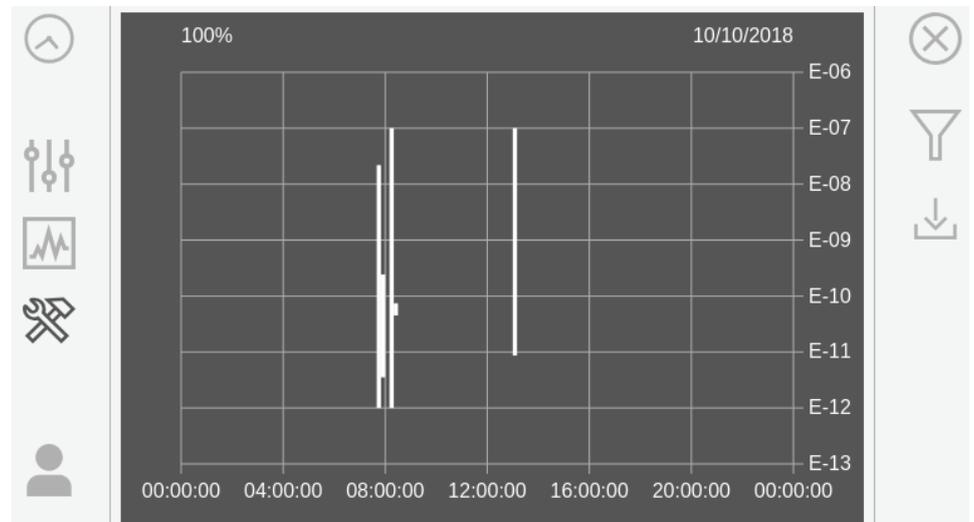
## 6.5.3 Display measurement data

You can view measurement data in graphically formatted form on the device display.

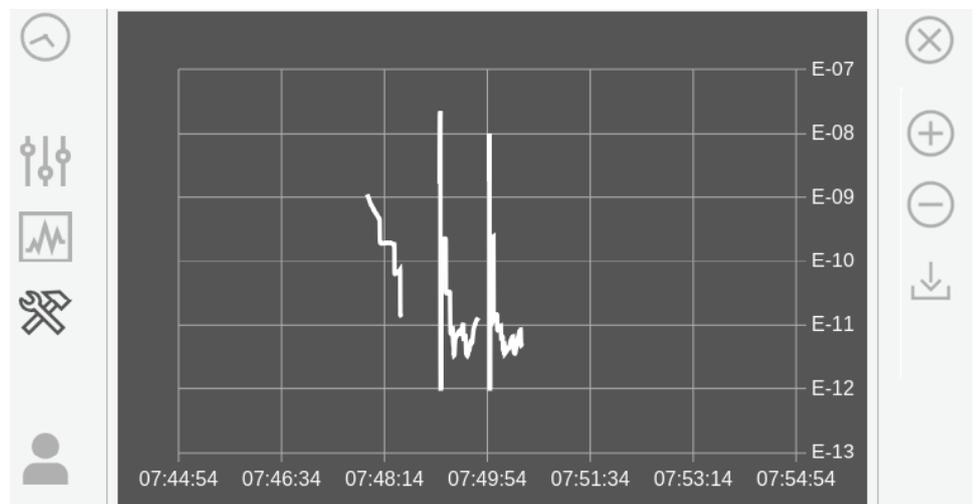
- ✓ The measurement data were recorded. See also "Switch on data recording and configure export [▶ 67]".

- 1**  > Measurement data > Display measurement data

⇒ The display shows the measurement data of the current day. Each bar represents approximately a quarter of an hour in which measurements were taken.



- 2 To view the measurements of any day, press , select the desired day, confirm your entry with , and close the setting window with .
- 3 To export the displayed time range, connect a USB flash drive (FAT32 formatted) to the leak detector and press . For the scope of the exported data see also “Switch on data recording and configure export [▶ 67]“.
- 4 To obtain a detailed view of measurement data, press a bar in the desired period with your finger.



- 5 To change the period displayed in the detailed view, wipe the display to the right or left.  
To change the time axis, press  or .
- 6 To export the displayed time range, connect a USB flash drive (FAT32 formatted) to the leak detector and press . For the scope of the exported data see also “Switch on data recording and configure export [▶ 67]“.

## 6.5.4 Export measurement data via network

In addition to access to the graphical user interface, you also have the option of retrieving specific measurement data from your leak detector.

A data interface was implemented for this purpose (REST interface). This interface responds to requests on port 3000 when valid parameters are transmitted with data in the requested format.

- ✓ A network connection has been established between the leak detector on one side and the PC or Tablet on the other side.  
See also “Operate leak detector via web browser (LAN) [▶ 111]” or “Operate leak detector via web browser (wireless LAN) [▶ 113]”.
- ✓ The measurement data were recorded. See also “Switch on data recording and configure export [▶ 67]”.
- ▶ You have two options for exporting the desired measurement data:
  - ⇒ You use the convenient options to first display measurement cycles or measurement data graphically and click on . See also “Display measurement cycles [▶ 68]” or “Display measurement data [▶ 68]”. After activating the  from the PC or Tablet, a file with the relevant measurement data is offered for download
  - ⇒ Alternatively, enter your request with the desired parameters as URL in your browser. With this procedure, you not only set the desired time period (a block of maximum 24 hours), but you can also select the file format and data scope (with or without metadata).

Example 1:

```
http://192.168.11.124:3000/md?f=csv_en&c=4&d=mr
```

Returns measured values and metadata of the measurement cycle with ID 4 in the format “csv\_en”.

Example 2:

```
http://192.168.11.124:3000/md?dts=2018-11-05T23:00:00.000Z&dte=2018-11-06T23:00:00.000Z&f=json&d=r
```

Returns measured values between 2018-11-05T23:00:00.000Z und 2018-11-06T23:00:00.000Z in the “json” format.

Parameter	Name	Description	Options	For example
c	Measurement cycle	Querying one or more measurement cycles via ID	ID's of the measurement cycles. Separated by comma for several	c=3 c=3, 5, 8

Parameter	Name	Description	Options	For example
dts	Start	The start time of the time period from which data is to be exported.	A date in ISO format in UTC time	dts=2018-08-02T17:15:12.000Z
dte	End	The end time of the time period from which data is to be exported.	A date in ISO format in UTC time	dte=2018-08-02T17:45:35.000Z
f	Format	The data format of the export	json, csv_en, csv_de Standard: csv_en	f=json f=csv_en
d	Scope	Scope of the data. With or without metadata	mr: Meta and measured values m: Meta only r: only measured values Standard: mr	d=mr d=r

### 6.5.5 Measurement data database: Information

The maximum size of the database corresponds approximately to the number of measured values that are generated over the period of one month during continuous recording. This corresponds to a database size of approx. 1.5 GB.

If storage is needed for the recording and the maximum database size (in measurement values) has been exceeded, the oldest records are automatically deleted so that 5% of the specified capacity is freed for new data.

✓  **Supervisor** - rights

▶  > Measurement data > Database information

⇒ The following is displayed:

"Current database size" in [Byte]

"Measurement values": Number of measurement values in the database

"Max. database size": Number of measurement values that can be stored in the database

"Level"

"Oldest record": Time stamp of the oldest measurement value

"Newest record": Time stamp of the newest measurement value

**See also**

 Resetting to factory settings [▶ 80]

## 6.6 Information

### 6.6.1 Retrieve information about the device

Diverse information on the device is shown: Software and serial numbers, network information and operating hours.

- ▶  > Information > Device > Identification
  
- ▶  > Information > Device > Network
  
- ▶  > Information > Device > Operating hours

### 6.6.2 Call information on the assemblies

Diverse measurement values and information to the following assemblies is shown: Preamplifier, ion source, turbo molecular pump (TMP), processor assembly MSB, backing pump and its frequency converter.

- ▶  > Information > Assemblies > Ion source
  
- ▶  > Information > Assemblies > MSB
  
- ▶  > Information > Assemblies > TMP
  
- ▶  > Information > Assemblies > Preamplifier

### 6.6.3 Information on connected accessories

- ▶  > Information > Accessories > I/O module
- ⇒ If an IO Interface is connected, you will find details.

### 6.6.4 Call the energy data information

Diverse measure supply voltages, electrical power and temperatures are shown.

- ▶  > Information > Energy > Power
  
- ▶  > Information > Energy > Voltage (1)
- ⇒ In this window the first part of the information to the voltage is shown.

- ▶  > Information > Energy > Voltage (2)

⇒ In this window the second part of the information to the voltage is shown.

### 6.6.5 Call the latest information to the current measurement value

- ▶  > Information > Measurement values > Leak rate and pressure

⇒ The leak rate and different pressure values are shown.

- ▶  > Information > Measurement values > Temperature

⇒ Different temperature values are displayed.

- ▶  > Information > Measurement values > Run times

⇒ The current runtime information is displayed.

### 6.6.6 Call the latest information to the current calibration value

- ▶  > Information > Calibration

## 6.7 Log

### 6.7.1 Call the error and warning log

- ▶  > Information > Log > Errors and warnings

If there are more than 20 entries always the oldest entry is deleted.

### 6.7.2 Call the TMP log

Display of the fault and warning history of the turbo molecular pump.

The entries are for the entire period of use of the device. If there are more than 10 entries always the oldest entry is deleted.

- ▶  > Information > Log > TMP log

### 6.7.3 Call calibration log

The entries are for the entire period of use of the device. If there are more than approx. 20 entries always the oldest entry is deleted.

- ▶  > Information > Log > Calibrations

### 6.7.4 Call maintenance log

- ▶  > Information > Log > Maintenance

If there are more than 20 entries always the oldest entry is deleted.

## 6.8 Device settings

### 6.8.1 Viewing and customizing individual parameters

You are able to get a quick overview of the actual settings of the device and you can make modifications, if needed.

- ✓ You have the required right to change the specific parameter.

1  > Sets of parameters > Parameter list

⇒ The device settings will be displayed as a list.

2 Modify individual parameters, if needed.

3 Save .

- ▶ To modify parameters, press alternatively a subheading in the list. A separate setting window will be opened, where you can change and save.

⇒ After changing a parameter setting in a separate window press  to return to the list of parameters.

## 6.8.2 Saving and managing sets of parameters

A set of parameters is a collection of parameters with the relevant settings of the device. You are able to save sets of parameters in text-based files at any time. The parameters can be viewed in clearly arranged form.

✓  **Supervisor** - rights

1  > Sets of parameters > Manage sets of parameters

⇒ Sets of parameters already created will be displayed as a list.

If the values of a saved set of parameters match the actual settings of the device 100 %, a green dot will be displayed.

2 To create a new set of parameters, press .

⇒ In the next window you can insert a free text description. The prefix “parameter-set” and the date of saving are used for the file name. Save . You are able to save max 10 sets of parameters.

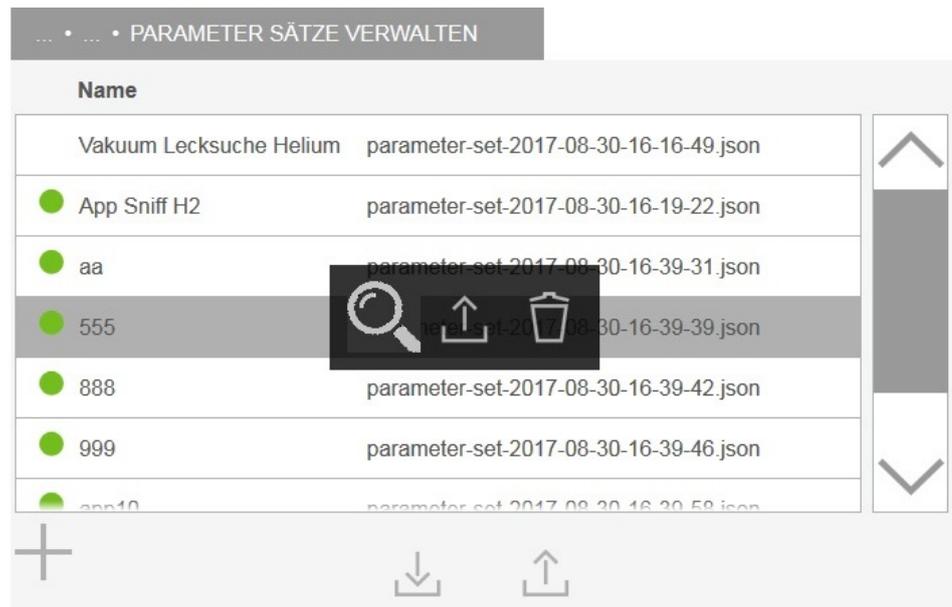
3 To open the context menu of a created set of parameters, press the desired set of parameter and choose

, to view further details concerning the parameters contained. If parameters do not match actual device settings, an orange dot will be displayed.

If there is a missing setting, a red dot will be displayed (after a software update for example). We recommend to view the missing setting, to create a new set of parameters and to delete the old set of parameters.

, to activate a set of parameters.

, to delete a set of parameters.



### 6.8.3 Exporting or importing sets of parameters

You are able to transfer saved sets of parameters from the internal memory to an attached USB flash drive and to import the sets again.

✓ **Supervisor** - rights

- 1 > Sets of parameters > Manage sets of parameters
- 2 To export all sets of parameters to a USB flash drive (formatted in FAT32) if needed, press below the list.
- 3 To import all sets of parameters from a USB flash drive into the device, press below the list.
  - ⇒ All sets of parameters on the USB flash drive will be saved in the device, if the number of 10 is not exceeded. Using a PC you can delete redundant sets of parameters on the USB flash drive before transferring.
  - ⇒ You must not modify parameters of a set of parameters on the USB flash drive before importing. You cannot transfer these files to the device after the modification.

## 6.9 Updating the software

The device has two different software versions: One for the user interface and one for the basic unit. Each has its own independent versions number.

### 6.9.1 Update the user interface software

Import software updates using a USB flash drive.

## NOTICE

### Data loss due to an aborted connection

- ▶ Do not switch off the device and do not remove the USB flash drive while the software is being updated.

#### ✓ Supervisor - rights

- 1 Copy the file into the main directory of a FAT32 formatted USB flash drive.
- 2 Connect the USB flash drive to a USB port on the device.
- 3  > Update > Update Operating Unit
  - ⇒ At the top in the window the active software version of the user interface is shown.  
If one or more versions of the software are on the USB flash drive the most recent version is shown on the line below. If this is the same as the version already installed the background is green, otherwise it is red.
- 4 In order to load the new software version, press on the button "Update".
  - ⇒ After completion there is an automatic restart of the operating unit.

## 6.9.2 Updating the software of the basic unit

Import software updates using a USB flash drive.

## NOTICE

### Data loss due to an aborted connection

- ▶ Do not switch off the device and do not remove the USB flash drive while the software is being updated.

#### ✓ Supervisor - rights

- 1 Copy the file into the main directory of a FAT32 formatted USB flash drive.
- 2 Connect the USB flash drive to the USB port on the device.
- 3  > Update > Update Basic Unit
  - ⇒ At the top in the window the active software version of the basic unit is shown.  
If one or more versions of the software are on the USB flash drive the most recent version is shown on the line below. If this is the same as the version already installed the background is green, otherwise it is red.
- 4 In order to load the new software version, press on the button "Update".
  - ⇒ After completion there is an automatic restart of the system.

### 6.9.3 Update the software in expert mode

✓  **Supervisor** - rights

1  > Update > Update operating unit/basic unit > Expert

⇒ Software versions already available on the device are shown in a list.

2 Highlight any of the software versions as required and proceed to step 5.

⇒ Resetting to an older software version is possible.

3 If alternatively you want to add a new software version, connect a FAT32 formatted USB flash drive with the update file to one of the USB ports of the device.

4 In order to load the new software version, press on .

5 To activate the new version, select the desired list entry and press .

⇒ After completion there is an automatic restart of the system.

### 6.9.4 Unlock feature

✓ You have ordered an additional feature from the manufacturer specifying the serial number of your leak detector.

✓ You have received an unlock code from the manufacturer.

✓  **Supervisor** - rights

1  > Update > Unlock feature

2 Enter your unlock code in the "Unlock code" field.

3 Save .

⇒ After successful activation, the new feature is displayed.

**See also**

 Retrieve information about the device [[▶ 72](#)]

## 6.10 Lock screen

You can protect the screen against unintended operation by accidental movement.

You can activate or deactivate this protection at any time after starting up the device.

1  > Lock screen

⇒ The screen lock will be activated and an icon "safety lock" will be displayed on the screen.

2 To terminate the screen lock, tap the screen in any position and confirm the question in the dialog window.

## 6.11 Use external monitor

You are able to use an external touch monitor instead of the internal monitor. You can use either the internal or the external monitor.

- ✓ You have a touch monitor with connections for HDMI and USB, furthermore an appropriate power supply. HDMI is required to transmit the images, USB is required to transmit the sound.

- 1 Connect the HDMI cable and the USB cable of the touch monitor with the connector block of your leak detector, see also "Connections for accessories and control signals [▶ 26]". For proper operation, make sure that the cable length does not exceed 3 m.

- 2  > Display > Switch monitor

- 3 Press the "External Monitor" button.

⇒ The picture will be displayed on the external monitor.

- ▶ Instead of changing the monitor display, you can connect the external monitor before switching on the device.

⇒ Then the picture will be displayed on the external monitor without changing settings.

### Switch to internal monitor

When the instrument is switched on, you will be able to switch to internal monitor at any time.

- 1  > Display > Switch monitor

- 2 Press the "Internal Monitor" button.

## 6.12 View vacuum diagram

To check the function and the operating state of the measuring system at a glance, call up the simplified diagram of the vacuum diagram.

- ▶  > Information > Vacuum diagram

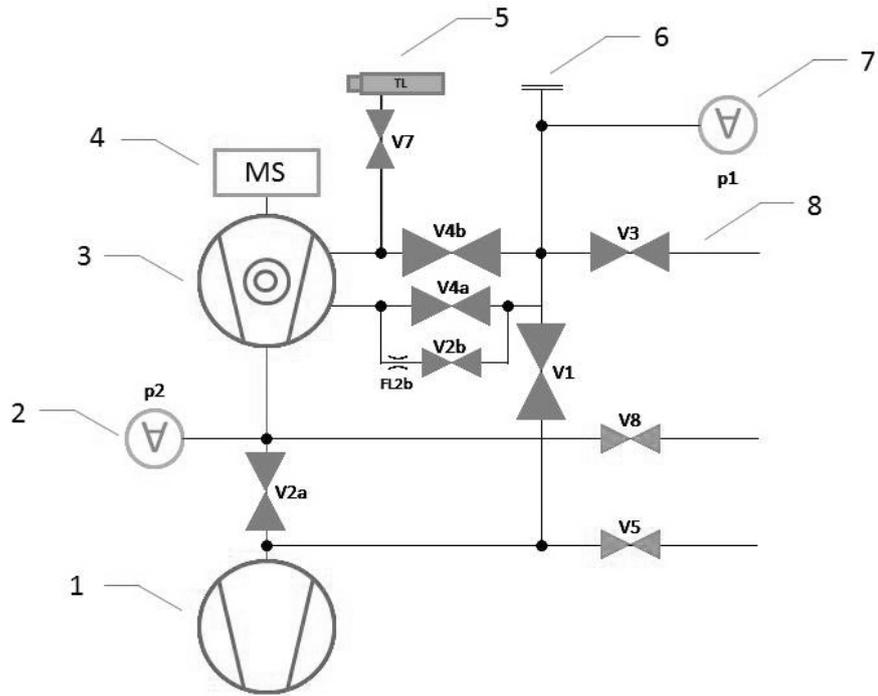


Fig. 11: The most important components of the vacuum diagram in PHOENIX devices

1	Backing pump	5	Internal test leak "TL7"
2	Fore-vacuum pressure gauge	6	Inlet flange
3	Turbo molecular pump	7	Inlet pressure gauge
4	Mass spectrometer	8	V1 ... V8: Solenoid valves for controlling gas flows

To switch to the display of a connected partial flow system, see "Set and use external partial flow system [▶ 61]".

## 6.13 Resetting to factory settings

You can restore the device to factory settings.



### Loss of settings and measurement data

After resetting to factory settings only the manufacturer factory settings are in the memory of the device. The software of the device is not reset when restoring the factory settings.

#### ✓ Supervisor - rights

1 > Reset

2 Make your choice:

⇒ If you want to reset all settings, press the "Reset settings" button.

- ⇒ If you want to delete all recorded measurement data and user accounts, press the "Delete data" button.
- ⇒ To reset the device to the factory settings, press both buttons one after the other.

## 6.14 Logging off from the device

- 1** Press on your name which appears on the top left of the display.
  - ⇒ The window "User accounts" opens. See also "Modify Personal Settings [▶ 42]".
- 2** You log off from the device via the button "Log off".
  - ⇒ The login window opens.

## 6.15 Switching off the device

You can switch off the device at the mains switch at any time. The parameters set in the device remain saved.

## 7 Warning and error messages

During operation, the display shows information that helps you operate the instrument. Measurement values are displayed along with current unit modes, operating instructions as well as warnings and error messages. The instrument is equipped with extensive self-diagnostic functions. If the electronics detect a faulty state, the device will show this as far as possible on the display and will interrupt operation when necessary. Warning and error messages consist of a number, a descriptive text, and often an associated measured value (e.g., a measured voltage).

### Warnings

Warnings warn of instrument modes that can impair the accuracy of measurements. Operation of the instrument is not interrupted.

For details about the cause and the remedy, press .

To close a warning message, press the button "Clear" after reading.

### Error messages

Errors are events that force the interruption of the operation.

For details about the cause and the remedy, press .

Once you have found the cause for the error continue operation by pressing the button "Clear".

### Active errors and warnings

This menu item is only displayed when the template contains errors or warnings:

▶  > Errors and warnings

### Confirmed warnings

If an active warning is acknowledged without rectifying the cause, it is displayed under "Confirmed warnings".

▶  > Confirmed warnings

### Reference on the display

An overview of possible errors and warnings can be found at:

▶  > Information > Help

### 7.1 List of warning and error messages

Type	Notification	Possible sources of error	Remedy
W102	Timeout during communication with EEPROM on VI-Board	The EEPROM on the VI-Board is defective or does not exist	<ul style="list-style-type: none"> <li>Contact customer service</li> </ul>

Type	Notification	Possible sources of error	Remedy
W104	One EEPROM parameter has been initialized	A new parameter was introduced by a software update	<ul style="list-style-type: none"> <li>• Confirm the warning message</li> <li>• Check that the message does not appear when you restart the device</li> <li>• Check whether the factory settings correspond with the new parameter of your application</li> </ul>
		The EEPROM on the VI-Board is defective	<ul style="list-style-type: none"> <li>• Confirm the warning message</li> <li>• Check if the message occurs each time when you restart the device</li> <li>• Contact customer service</li> </ul>
W106	Several EEPROM parameters have been initialized	A software update introduced new parameters	<ul style="list-style-type: none"> <li>• Confirm the warning message</li> <li>• Check that the message does not appear when you restart the device</li> <li>• Check whether the factory settings comply with the new parameters of your application</li> </ul>
		The EEPROM on the VI-Board was replaced	<ul style="list-style-type: none"> <li>• Confirm the warning message</li> <li>• Check that the message does not appear when you restart the device</li> <li>• Check whether the factory settings comply with the new parameters of your application</li> </ul>
		The EEPROM on the VI-Board is defective	<ul style="list-style-type: none"> <li>• Confirm the warning message</li> <li>• Check if the message occurs each time when you restart the device</li> <li>• Contact customer service</li> </ul>
E107	Internal IIC communication error	Internal IIC communication error	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
E108	Internal IIC2 communication error	Internal IIC2 communication error	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>

Type	Notification	Possible sources of error	Remedy
W110	Real-time clock was reset! Please enter date and time	The real-time clock has not been set	<ul style="list-style-type: none"> <li>• Enter the correct date and time</li> <li>• Check that the message does not appear when you restart the device</li> </ul>
		Battery jumper on the MSB not set	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
		Rechargeable battery on MSB is discharged or defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
		Real-time clock defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W122	No response from the BUS-Modul	Connection to BUS module interrupted	<ul style="list-style-type: none"> <li>• Check the connection to the BUS module</li> <li>• Replace the connection cable to the bus module</li> </ul>
		Bus module defective	<ul style="list-style-type: none"> <li>• Replace the bus module</li> </ul>
		Bus module connection on the device defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W125	I/O module no longer connected	Connection to I/O module interrupted	<ul style="list-style-type: none"> <li>• Check the connection to the I/O module</li> <li>• Replace the connection cable to the I/O module</li> </ul>
		I/O module defective	<ul style="list-style-type: none"> <li>• Replace the I/O module</li> </ul>
		I/O module connection on the device defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W127	Wrong bootloader version	The bootloader is not compatible with application	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
E129	EEPROM contains data from wrong device class	The software of the basic unit does not match the EEPROM	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
		The EEPROM does not match this device class	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W151	No communication with operating unit	A software update or a parameter reset has been executed	<ul style="list-style-type: none"> <li>• Confirm the warning message</li> <li>• Check that the message does not appear when you restart the device</li> </ul>
		Internal connection problem between the basic unit and the operating unit	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>

Type	Notification	Possible sources of error	Remedy
W152	No communication with control panel	Internal connection problem between the basic unit and the control panel	<ul style="list-style-type: none"> <li>Contact customer service</li> </ul>
W153	Operating unit software version is obsolete	A more up-to-date operating unit software is available. For trouble-free operation, it is recommended to update the operating unit software.	<ul style="list-style-type: none"> <li>Contact the customer service for the latest operating unit software</li> </ul>
W171	CU1000 not supported	A CU1000 cannot be used with this device	<ul style="list-style-type: none"> <li>Disconnect the CU1000 from this device</li> </ul>
W201	Voltage U24V_MSB too low	Malfunction of 24V power supply unit	<ul style="list-style-type: none"> <li>Contact customer service</li> </ul>
		Short circuit or overload in the 24V supply	<ul style="list-style-type: none"> <li>Contact customer service</li> </ul>
W202	Voltage U24V_MSB too high	Malfunction of 24V power supply unit	<ul style="list-style-type: none"> <li>Contact customer service</li> </ul>
W203	24V valve supply voltage out of range	Malfunction of a valve	<ul style="list-style-type: none"> <li>Contact customer service</li> </ul>
		Short circuit or overload in the 24V valve supply	<ul style="list-style-type: none"> <li>Contact customer service</li> </ul>
W206	24V operating unit supply voltage out of range	Malfunction of operating unit	<ul style="list-style-type: none"> <li>Contact customer service</li> </ul>
		Short circuit or overload in the 24V operating unit supply	<ul style="list-style-type: none"> <li>Contact customer service</li> </ul>
W207	12V internal supply voltage out of range	Short circuit or overload in the 12V supply	<ul style="list-style-type: none"> <li>Contact customer service</li> </ul>
W208	24V fan supply voltage out of range	Malfunction of a fan	<ul style="list-style-type: none"> <li>Contact customer service</li> </ul>
		Short circuit or overload in the 24V fan supply	<ul style="list-style-type: none"> <li>Contact customer service</li> </ul>

Type	Notification	Possible sources of error	Remedy
W209	24V DIV1 supply voltage out of range	Short circuit or overload in the 24V DIV1 supply	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W210	24V DIV2 supply voltage out of range	Short circuit or overload in the 24V DIV2 supply	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W211	5V internal supply voltage out of range	Short circuit or overload in the internal 5V supply	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W212	5V sniffer line supply voltage out of range	Sniffer line defective	<ul style="list-style-type: none"> <li>• Use another sniffer line, if possible</li> <li>• Contact customer service</li> </ul>
		Short circuit or overload in the 5V sniffer line supply	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W221	Internal voltage 24V_RC voltage out of range	The remote control is defective	<ul style="list-style-type: none"> <li>• Use another remote control, if possible</li> </ul>
		The cable connected to REMOTE CONTROL connector is defective	<ul style="list-style-type: none"> <li>• Use another cable, if possible</li> </ul>
		The accessory connected to ACCESSOIRES connector is defective	<ul style="list-style-type: none"> <li>• Use another accessory, if possible</li> </ul>
		The cable connected to ACCESSOIRES connector is defective	<ul style="list-style-type: none"> <li>• Use another cable, if possible</li> </ul>
		Short circuit or overload in the 24V_RC supply	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W222	Internal voltage 24V_IO voltage out of range	The module connected to LD connector is defective	<ul style="list-style-type: none"> <li>• Use another module, if possible</li> </ul>
		The cable connected to LD connector is defective	<ul style="list-style-type: none"> <li>• Use another cable, if possible</li> </ul>
		Short circuit or overload in the 24V_IO supply	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>

Type	Notification	Possible sources of error	Remedy
W223	Internal voltage 24V_TMP1 voltage out of range	Short circuit or overload in the 24V_TMP1 supply	• Contact customer service
W224	Internal voltage 24V_PRESSURE (Pirani) voltage out of range	Short circuit or overload in the 24V_PRESSURE (Pirani) supply	• Contact customer service
W240	Voltage +15V out of range	Short circuit at preamplifier	• Contact customer service
		VI-Board or MSB defective	• Contact customer service
W241	Voltage -15V out of range	Short circuit at preamplifier	• Contact customer service
		VI-Board or MSB defective	• Contact customer service
E242	+15V or -15V voltage shorted	Short circuit at preamplifier	• Contact customer service
		VI-Board or MSB defective	• Contact customer service
W250	REF5V voltage out of range	Short circuit at preamplifier	• Contact customer service
		VI-Board or MSB defective	• Contact customer service
E252	REF5V voltage shorted	Short circuit at preamplifier	• Contact customer service
		VI-Board or MSB defective	• Contact customer service
W300	Anode voltage too low	Short circuit of the anode voltage	• Contact customer service
		VI-Board or MSB defective	• Contact customer service
W301	Anode voltage too high	MSB defective	• Contact customer service
W302	Suppressor voltage too low	Short circuit suppressor or preamplifier	• Contact customer service
		VI-Board or MSB defective	• Contact customer service
W303	Suppressor voltage too high	MSB defective	• Contact customer service

Type	Notification	Possible sources of error	Remedy
W304	Anode-cathode voltage too low	Short circuit between anode and cathode	• Contact customer service
		VI-Board or MSB defective	• Contact customer service
W305	Anode-cathode voltage too high	MSB defective	• Contact customer service
E306	Anode voltage wrong	The anode voltage set value is outside the allowable range	• Perform a calibration • Contact customer service
		MSB defective	• Contact customer service
W310	Cathode 1 broken	Cathode defective	• Check that the other cathode has been switched on • Contact customer service
		Connection to cathode broken	• Contact customer service
		VI-Board or MSB defective	• Contact customer service
W311	Cathode 2 broken	Cathode defective	• Check that the other cathode has been switched on • Contact customer service
		Connection to cathode broken	• Contact customer service
		VI-Board or MSB defective	• Contact customer service
E312	Cathodes broken	Both cathodes defective	• Contact customer service
		Connection to cathode broken	• Contact customer service
		VI-Board or MSB defective	• Contact customer service
E340	Emission error	Pressure too high with aged cathode	• Contact customer service
W342	Cathode not connected	Both cathodes defective during self-test	• Contact customer service
		Plug of ion source not connected	• Contact customer service

Type	Notification	Possible sources of error	Remedy
W350	Suppressor not connected	Suppressor cable not connected or defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
E352	Preamplifier not connected	Preamplifier defective or cable not connected	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W358	Alternate preamplifier ranges	Preamplifier defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
		Unusual leak rate waveform	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W359	Overdriven preamplifier	Ion source or preamplifier defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
		Mass spectrometer contaminated	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W360	Preamplifier output too low	Ion source bad	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
		Mass spectrometer contaminated	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W361	The offset voltage of the preamplifier is too high	Preamplifier defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W362	Preamplifier range error	Preamplifier defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
		MSB defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W390	500 GOhm resistor out of range	Preamplifier defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
		MSB defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
E400	TMP error message	Unhandled error message from the TMP	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
E402	No communication with turbo pump converter	TMP cable defective or not connected	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
		TMP converter defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
		MSB defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W405	No TMP run-up time	Inlet pressure during run-up too high	<ul style="list-style-type: none"> <li>• Check that the backing pump is working during run-up</li> <li>• Check that the pressure drops during run-up</li> <li>• Contact customer service</li> </ul>
		TMP bearing damage	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>

Type	Notification	Possible sources of error	Remedy
E410	TMP temperature too high	The ambient temperature is too high	<ul style="list-style-type: none"> <li>• Turn off the device and let it cool down</li> <li>• Reduce the temperature in the environment in which the device stands</li> </ul>
		Air filter dirty	<ul style="list-style-type: none"> <li>• Clean the air vents or replace the filter plates</li> </ul>
		Fan blocked or defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
E422	No TMP run-up time	Inlet pressure during run-up too high	<ul style="list-style-type: none"> <li>• Check that the backing pump is working during run-up</li> <li>• Check that the pressure drops during run-up</li> <li>• Contact customer service</li> </ul>
		TMP bearing damage	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
E430	TMP bearing temperature too high (one hour > 60°C)	The ambient temperature is too high	<ul style="list-style-type: none"> <li>• Turn off the device and let it cool down</li> <li>• Reduce the temperature in the environment in which the device stands</li> </ul>
		Air filter dirty	<ul style="list-style-type: none"> <li>• Clean the air vents or replace the filter plates</li> </ul>
		Fan blocked or defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
W431	TMP bearing temperature too high (> 60°C)	The ambient temperature is too high	<ul style="list-style-type: none"> <li>• Turn off the device and let it cool down</li> <li>• Reduce the temperature in the environment in which the device stands</li> </ul>
		Air filter dirty	<ul style="list-style-type: none"> <li>• Clean the air vents or replace the filter plates</li> </ul>
		Fan blocked or defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
E500	Pressure sensor p1 not connected	Pressure sensor not connected or cable defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>
		VI-Board or MSB defective	<ul style="list-style-type: none"> <li>• Contact customer service</li> </ul>

Type	Notification	Possible sources of error	Remedy
E502	Pressure sensor p2 not connected	Pressure sensor not connected or cable defective	• Contact customer service
		VI-Board or MSB defective	• Contact customer service
E520	Pressure too high	Pressure p2 too high for at least 15s	• Contact customer service
E521	Pressure rise, anode voltage collapsed	Pressure rise at pressure sensor p2 and anode voltage collapsed	• Contact customer service
W522	Pressure rise, emission break down	Pressure rise at pressure sensor p2 and emission collapsed	• Contact customer service
W540	Flow through capillary is too low! Leaks may not be detectable	Filter is dirty	• Replace the sniffer tip filter
		Sniffer tip or capillary blocked	• Remove the blocking of the sniffer tip • Use another sniffer line, if possible • Contact customer service
		The pressure limit for a blocked capillary is set too high	• Check and change the pressure limit, if necessary
W541	Flow through capillary is much too low! Leaks may not be detectable	Filter is dirty	• Replace the sniffer tip filter
		Sniffer tip or capillary blocked	• Remove the blocking of the sniffer tip • Use another sniffer line, if possible • Contact customer service
		The pressure limit for a blocked capillary is set too high	• Check and change the pressure limit, if necessary
W542	Flow through capillary too high	Capillary broken or leaky	• Use another sniffer line, if possible • Contact customer service
		The pressure limit for a broken capillary is set too low	• Check and change the pressure limit, if necessary

Type	Notification	Possible sources of error	Remedy
W559	Leak rate too high! Switched to Standby to prevent contamination!	Gross leak at test object or the connection to the test object	<ul style="list-style-type: none"> <li>Check the tightness of the connection between the leak detector and the test object</li> </ul>
		Gross leak protection limit is set too low	<ul style="list-style-type: none"> <li>Check and change the gross leak protection limit, if necessary</li> </ul>
		Audio alarm delay time too short	<ul style="list-style-type: none"> <li>Check and change the alarm delay, if necessary</li> </ul>
W580	Maximum evacuation time until 100 mbar exceeded	Gross leak at test object or the connection to the test object	<ul style="list-style-type: none"> <li>Check the tightness of the connection between the leak detector and the test object</li> <li>Use another test object, if possible</li> </ul>
		The settings value for the max. evacuation time gross leak is too low	<ul style="list-style-type: none"> <li>Check and change the max. evacuation time gross leak if necessary</li> </ul>
W581	Maximum evacuation time until measurement exceeded	Gross leak at test object or the connection to the test object	<ul style="list-style-type: none"> <li>Check the tightness of the connection between the leak detector and the test object</li> <li>Use another test object, if possible</li> </ul>
		The settings value for the max. evacuation time until measurement is too low	<ul style="list-style-type: none"> <li>Check and change the max. evacuation time until measurement if necessary</li> </ul>
W630-Phoenix	Calibration request	Operation mode or mass has changed	<ul style="list-style-type: none"> <li>Perform a calibration</li> </ul>
		Runtime over 30 minutes and temperature change by 5 Kelvin since last calibration	<ul style="list-style-type: none"> <li>Perform a calibration</li> </ul>
		Runtime over 30 minutes and no calibration since 24 hours	<ul style="list-style-type: none"> <li>Perform a calibration</li> </ul>
W670	Calibration error (emission break down)	During calibration the emission collapsed	<ul style="list-style-type: none"> <li>Check if the message occurs again when you perform a new calibration</li> <li>Contact customer service</li> </ul>

Type	Notification	Possible sources of error	Remedy
W700	Preamplifier temperature is too low	Ambient temperature is too low	• Increase the temperature in the environment in which the device stands
		Temperature sensor is defective	• Contact customer service
W702	Preamplifier temperature is too high	The ambient temperature is too high	• Reduce the temperature in the environment in which the device stands
		Air filter dirty	• Clean the air vents or replace the filter plates
		Fan blocked or defective	• Contact customer service
W710	MSB temperature is too high	The ambient temperature is too high	• Reduce the temperature in the environment in which the device stands
		Air filter dirty	• Clean the air vents or replace the filter plates
		Fan blocked or defective	• Contact customer service
E711	Max. MSB temperature exceeded	The ambient temperature is too high	• Reduce the temperature in the environment in which the device stands
		Air filter dirty	• Clean the air vents or replace the filter plates
		Fan blocked or defective	• Contact customer service
W901	Maintenance: TMP bearing lubricant	Maintenance interval for TMP bearing lubricant exceeded	• Contact customer service
W903	Maintenance: Calibration leak expired	Maintenance interval for calibration leak exceeded	• Contact customer service
W904	Maintenance: Sniffer tip filter	Maintenance interval for sniffer tip filter exceeded	• Contact customer service
W910	Maintenance: Backing pump	Maintenance interval for backing pump exceeded	• Contact customer service
W920	Maintenance: Exhaust filter	Maintenance interval for exhaust filter exceeded	• Contact customer service

Type	Notification	Possible sources of error	Remedy
W925	Maintenance: Air filter	Maintenance interval for air filter exceeded	<ul style="list-style-type: none"><li>• Contact customer service</li></ul>

# 8 Cleaning and maintenance

All cleaning and maintenance work described here must be carried out without opening the device!



## ⚠ WARNING

### Life threatening hazard from electric shock

High voltages are inside the device. Touching parts where electrical voltage is present can result in death.

- ▶ Disconnect the device from the power supply prior to any installation and maintenance work.. Ensure that the electrical supply cannot be switched back on unintentionally.
- ▶ Don't open the device!

## 8.1 Maintenance plan

Regardless of the described maintenance cycles a replacement of parts depends on contamination and wear.

### Maintenance table

Maintenance cycle	Personnel	Additional information	
daily	Operating personnel	8.5	Check oil-sealed backing pump
4000 h or half-yearly	Service personnel	8.9	Service at Leybold
In case of soiling	Operating personnel	8.2	Cleaning the housing
		8.3	Change the filter mat of the fan input
		8.6	Replacing the SL300 sniffer line filter

## 8.2 Cleaning the housing

Wipe the housing with a soft damp cloth.

Use only water to moisten. Avoid cleaners that contain alcohol, fat or oil.

Use a soft brush or a vacuum cleaner to clean the ventilation slots.

## 8.3 Change the filter mat of the fan input

Filter set with filter mat (5 pieces)

Order number E200001210

Required tools

None

Depending on the location, the filter mat on the back of the device may become dirty. Check the filter mat periodically and change it, if the filter mat is significant dirty.

✓ You have a new filter set.

- 1 Make sure that the device is disconnected from the power supply by pulling the power plug securely.
- 2 Gently lift the lower corners of the plastic grid and remove the plastic grid with the filter mat.
- 3 Replace the dirty filter set.

## 8.4 Replacing the fuses



### DANGER

#### Life threatening hazard from electric shock

- ▶ Disconnect the device from the power supply.
- ▶ Ensure that the electrical supply cannot be switched back on unintentionally.

- 1 Switch off the device and disconnect from the mains.
- 2 Pull the plug of the power cable out of the device.
- 3 The fuse holder of the device is located under a cover next to the power switch. Carefully pull the cover out of the device with the fuses attached beneath until the fuse holder can be tipped over to one side.
- 4 Remove the fuses and check them for any damage.
- 5 If necessary, replace the fuses. Only use fuses from the manufacturer. See scope of delivery. Two fuses of the same type must be used.
- 6 Press the fuse holder along with the fuses back into the starting position until the cover locks into place.

## 8.5 Check oil-sealed backing pump

If you have a leak detector with an oil-sealed backing pump, you should check the sight glasses for the oil level and the color of the oil at regular intervals.

- 1 On the side of the device, make sure whether the oil of the pump falls below the marked minimum level.
- 2 On the back of the device, check if the oil filter has become clogged and the oil exceeds the marked maximum level.

- 3 Determine whether the oil is light and transparent (normal case). If the oil is cloudy and milky when warm, this is a sign of steam. For example, water vapor can enter the backing pump when pumping off test specimens. This changes the oil properties and there is risk of corrosion of the pump.

If the backing pump contains too little oil, the oil filter has clogged up or the oil is cloudy and milky, contact the service.

## 8.6 Replacing the SL300 sniffer line filter

Filter felts (50 pieces)	Order number 200001116
Required tools	Screwdriver, tweezers

Structure of the sniffer tip

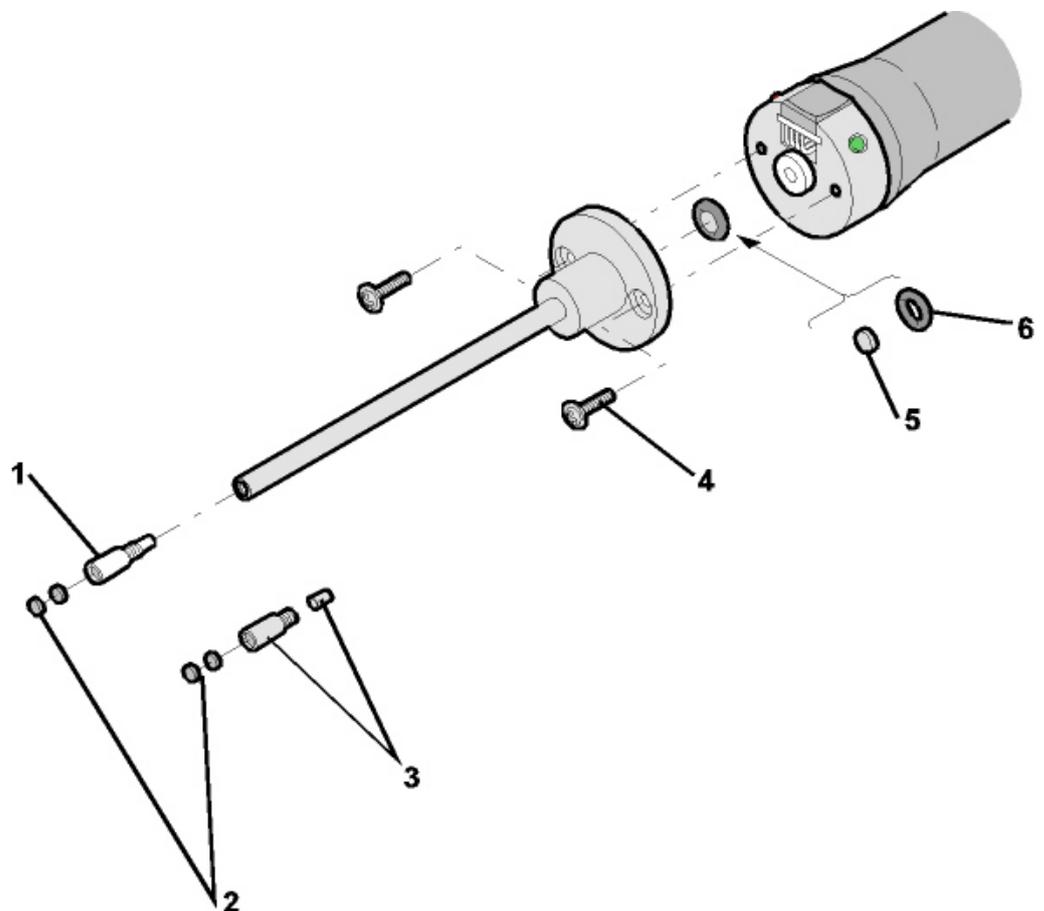


Fig. 12: Sniffer tip

1	Capillary filter (plastic; standard)	4	Cross-head screws
2	Felt pads	5	Sinter filter
3	Capillary filter (metal with gasket; option)	6	Gasket

A blockage of the sniffer tip can have the following causes:  
 Capillary filter blocked -> replace felt discs or capillary filter

Sinter filter clogged -> check or replace sinter filter

Capillary clogged in sniffer tip -> replace sniffer tip

Sniffer tip damaged -> replace sniffer tip

Sniffer line damaged / blocked -> replace SL 300.

### Replace felt discs or capillary filters

- Switch off the leak detector or disconnect the sniffer line from the device.
- Use tweezers to remove the dirty felt discs and replace them with new ones.

or

- Unscrew the capillary filter and replace it with a new one. Do not forget the gasket for the metal version!

### Check or replace the sinter filter

- 1 Switch off the leak detector or disconnect the sniffer line from the device.
- 2 Remove the two cross-head screws.
- 3 Remove the sinter filter with gasket.
- 4 Check the filter optically for soiling.
  - ⇒ If you do not see any soiling or only slight soiling, continue to use the sinter filter including gasket.

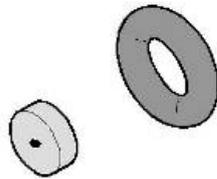


Fig. 13: Sintered filter slightly soiled

- ⇒ With heavy soiling, replace sinter filter including gasket.

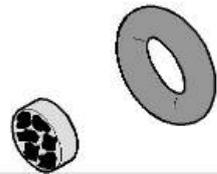


Fig. 14: Sintered filter heavily soiled

- 5 Tighten the sniffer tip again.
  - ⇒ The sniffer line is ready to be used again.

If you have activated the display of maintenance requests, set the maintenance interval to the desired new period. Also see "Activate or deactivate maintenance requests [▶ 49]" and "Set maintenance interval "Filter sniffer tip" or "Air filter" [▶ 49]".

## 8.7 Creating screenshots

You can save the current screen contents of the device to an image file. You can use such a file for service communication, for example.

- 1 Create a directory named "Screenshots" on a USB stick (FAT 32 formatted).
- 2 To take a screenshot, connect the USB stick to one of the USB ports of the leak detector, see also "Connections for accessories and control signals [▶ 26]".
  - ⇒ A screenshot is automatically taken and stored in the directory on the USB stick. The date and time are also saved.
- 3 To take another screenshot, disconnect the USB stick from the USB port and then reconnect it to the leak detector.
  - ⇒ A screenshot saved earlier will not be overwritten when another screenshot is taken.

## 8.8 Changing the serial number of the internal calibration leak



### Change of serial number when internal calibration leak is replaced

After the replacement of the calibration leak installed in the leak detector, the serial number of the new calibration leak and, if applicable, the leak rate must be entered.

The replacement of the calibration leak and the updating of the serial number is carried out by the manufacturer service or by authorised specialist personnel.

- ✓  **Supervisor** - rights
- ✓ The device has been released by the manufacturer for the serial number change. The required fields are only visible after activation.
  - 1  > Setup > Measurement > Calibration leak
  - 2 Enter the new serial number in the field "Serial number internal calibration leak".
  - 3 Enter the leak rate printed on the calibration leak or certificate for mbar l/s in the field "Internal calibration leak".
  - 4 Save .

Change the maintenance request for the internal calibration leak if you have activated it accordingly, see also "Activate or deactivate maintenance requests [▶ 49]".

## 8.9 Service at Leybold

Maintenance inside the device should only be performed by the manufacturer. We recommend having the device serviced every 4000 hours or every six months.

The maintenance usually includes:

- Visual inspection of hoses and connections
- Maintenance of the turbo molecular pump
- Maintenance of backing pump, if present (wet and dry)
- Maintenance valves/valve block
- Calibration of the calibration leak

If you send us a device, indicate whether the device is free of harmful substances or if it is contaminated. If it is contaminated, also indicate the type of hazard. Use a form prepared by us:

"Declaration of Contamination of Compressors, Vacuum Pumps and Components".

The form can be found on the Internet: [www.leybold.com](http://www.leybold.com) - Downloads - Download documents.

Attach the form to the device or attach it.

This declaration of contamination is required to comply with legal requirements and protect our employees.

Devices without explanation about contamination sends Leybold back to the sender.

For devices with oil-sealed backing pump, close the connection "EXHAUST" with the transport lock from the scope of delivery.



**Declaration of Contamination of Compressors, Vacuum Pumps and Components**

The repair and / or servicing of compressors, vacuum pumps and components will be carried out only if a correctly completed declaration has been submitted. Non-completion will result in delay. The manufacturer can refuse to accept any equipment without a declaration.

**A separate declaration has to be completed for each single component.**

This declaration may be completed and signed only by authorized and qualified staff.

Customer/Dep./Institute : _____ Address : _____ _____ Person to contact: _____ Phone : _____ Fax: _____ End user: _____	Reason for return: <input checked="" type="checkbox"/> applicable please mark <b>Repair:</b> <input type="checkbox"/> chargeable <input type="checkbox"/> warranty <b>Exchange:</b> <input type="checkbox"/> chargeable <input type="checkbox"/> warranty <input type="checkbox"/> Exchange already arranged / received <b>Return only:</b> <input type="checkbox"/> rent <input type="checkbox"/> loan <input type="checkbox"/> for credit <b>Calibration:</b> <input type="checkbox"/> DKD <input type="checkbox"/> Factory-calibr. <input type="checkbox"/> Quality test certificate DIN 55350-18-4.2.1
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<b>A. Description of the Leybold product:</b> Material description : _____ Catalog number: _____ Serial number: _____ Type of oil (ForeVacuum-Pumps) : _____	<b>Failure description:</b> _____ <b>Additional parts:</b> _____ <b>Application-Tool:</b> _____ <b>Application- Process:</b> _____
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<b>B. Condition of the equipment</b>	<b>No<sup>1)</sup></b>	<b>Yes</b>	<b>No</b>	<b>Contamination :</b>	<b>No<sup>1)</sup></b>	<b>Yes</b>
1. Has the equipment been used	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	toxic	<input type="checkbox"/>	<input type="checkbox"/>
2. Drained (Product/service fluid)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	corrosive	<input type="checkbox"/>	<input type="checkbox"/>
3. All openings sealed airtight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	flammable	<input type="checkbox"/>	<input type="checkbox"/>
4. Purged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	explosive <sup>2)</sup>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, which cleaning agent				radioactive <sup>2)</sup>	<input type="checkbox"/>	<input type="checkbox"/>
and which method of cleaning				microbiological <sup>2)</sup>	<input type="checkbox"/>	<input type="checkbox"/>
<sup>1)</sup> If answered with "No", go to D. ←				other harmful substances	<input type="checkbox"/>	<input type="checkbox"/>

<b>C. Description of processed substances (Please fill in absolutely)</b>											
1. <b>What substances have come into contact with the equipment ?</b> Trade name and / or chemical term of service fluids and substances processed, properties of the substances According to safety data sheet (e.g. toxic, inflammable, corrosive, radioactive)											
X	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:30%;">Tradename:</td> <td style="width:70%;">Chemical name:</td> </tr> <tr> <td>a)</td> <td></td> </tr> <tr> <td>b)</td> <td></td> </tr> <tr> <td>c)</td> <td></td> </tr> <tr> <td>d)</td> <td></td> </tr> </table>	Tradename:	Chemical name:	a)		b)		c)		d)	
Tradename:	Chemical name:										
a)											
b)											
c)											
d)											
2. Are these substances harmful ? <span style="float:right">No Yes</span> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ←											
3. Dangerous decomposition products when heated ? <span style="float:right">No Yes</span> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ← If yes, which ? _____											

<sup>2)</sup> Components contaminated by microbiological, explosive or radioactive products/substances will not be accepted without written evidence of decontamination.

**D. Legally binding declaration**

I / we hereby declare that the information supplied on this form is accurate and sufficient to judge any contamination level.

Name of authorized person (block letters) : _____ _____ Date	_____ signature of authorized person	_____ firm stamp
--	---	---------------------

17200001\_002\_C0 © Leybold

## 9 Decommissioning the measuring instrument

The device may be contaminated by the process or environmental factors. In this case, it must be professionally decontaminated. We offer this service at a fixed price. We kindly ask you to send us your request.

### **Health and environmental damage**

Contaminated parts can cause health and environmental damage.

Before starting work, find out about possible contamination. When handling contaminated parts, observe the relevant regulations and observe the protective measures.

### **Disassemble clean devices, separate and dispose of them according to their material type.**

We offer this service. We kindly ask you to send us your request.

If you send us a device, follow the instructions in the section “Service at Leybold [▶ 100]”.

# 10 Accessories and interfaces

## 10.1 Accessories and spare parts

The parts listed below can additionally be ordered:

<b>IO Interface</b>	
IO Interface	252211V02
<b>Bus module</b>	
Bus Interface module Profibus	252212V02
Bus Interface module ProfiNet	252213V02
Bus Interface module DeviceNet	252214V02
Bus Interface module EtherNet/IP	252215V02
<b>Data cable</b>	
Cable for interface module 0.5 m	252293V02
Cable for interface module 2 m	252290V02
Cable for interface module 5 m	252291V02
Cable for interface module 10 m	252292V02
<b>Sniffer line</b>	
SL300, 4 m length	252003
QT100 Helium Sample Probe QUICKTEST	15594
SL301, 4 m length	252025V01
SL301, 10 m length	252026V01
<b>Remote control</b>	
Remote control RC310, wired	252013V01
Remote control RC310WL, wireless	252014V01
<b>Miscellaneous</b>	
Test gas spray gun, with hose	16555
Partial flow system	14020
Filter set for fan input (5 pieces)	E200001210
Fine filter on centering ring for inlet flange, DN 25 KF	88396

### Sniffer line SL300 / SL301

By using the sniffer line the leak detector can easily be converted to a sniffer leak searcher. The length of the sniffer line is 4 m and 10 m respectively.

## QUICKTEST QT100

QT100 is an accessory for helium leak detectors. It consists of a gas pump with housing. The QT100 ensures a quick suction of the test gas and thus for a short response time.

Extra long sniffer lines can be connected via the gas inlet socket of the QT100. This enables sniffing leak detection for larger distances between the test object and the leak detector. For the QT100 sniffer lines are available with 5 m, 20 m or 50 m length.

## Remote control RC310C and RC310WL

With the RC310C remote control you can operate the leak detector over a cable with a length of up to 28 m. With the wireless remote control RC310, you can operate the leak detector at a distance of up to 100 m.

Via remote control you control the functions START, STOP / VENT (STOP/Ventilate), ZERO (background). The measured leak rate is displayed as a bar graph, as a numeric value or as a diagram on the display of the remote controls (see the RC310 Technical Manual).

Measurement values you create over a recording time of up to 24 hours in the internal memory of the remote controls. You transfer the data easily to a USB flash drive.

You can set an internal setpoint for warning when exceeding the setpoints. The warning occurs visually on the display and audibly via the built-in loudspeaker or the connected headset respectively.

The remote controls are placed in robust housings that allow ergonomic operation. Magnets on the lower side allow installation from horizontal to vertical metal surfaces.

## Search for the wireless remote control from the leak detector

If you have misplaced the RC310WL wireless remote control, you can trigger from your leak detector acoustic signals of this remote control.

- 1  > Setup > Accessories > RC310
- 2 Select the setting "ON" in the field "Paging request".  
⇒ The remote control emits acoustic signals.
- 3 To stop signals from being emitted after finding the remote control, select "OFF" in the "Paging request" field.

## Partial flow system

In partial flow operation, the test object is additionally evacuated with another pump.

When using the partial flow system (cat.-no. 14020), the following advantages result:

- faster response times
- Ready for measurement already from 1000 mbar inlet pressure
- fast pumping and flooding of large test objects

## 10.2 IO Interface

### 10.2.1 Establish connection between device and IO Interface

✓  **Supervisor** - rights

- 1 Connect the IO Interface with a data cable to the LD socket on the rear of the device, see "Connections for accessories and control signals [▶ 26]".
- 2  > Setup > Accessories > Device selection
- 3 Select the "IO module".
- 4 Save .

### 10.2.2 Configuring digital outputs

The digital outputs PLC-OUT 1 ... The available functions can be assigned in any way necessary to the 8 IO Interface.

✓  **Supervisor** - rights

- 1  > Setup > Accessories > I/O module > Configuration of digital outputs
- 2 Select the desired "Digital output".
  - ⇒ The outputs PLC-OUT 1 - 8 are available.
- 3 Select the desired "Function", see the table below.
- 4 Select the desired "Mode".
  - ⇒ The modes "Standard" or the mode "Inverse" are available for selection.  
To mode "Inverse": In the table overview the description of the state "open" must be replaced with the description of the state "closed".
- 5 Save .

Function	State:	Description
Off (open)	open:	always open
Ready for operation	closed:	Emission switched on, calibration process inactive, no error
	open:	Emission switched off or calibration process active or error
Emission on	closed:	Emission switched on
	open:	Emission switched off
Error	closed:	Error
	open:	No error
Error or warning	closed:	Error or warning
	open:	No error or warning
Run-up	closed:	Run-up

Function	State:	Description
	open:	no run-up
Calibration request	closed:	No external calibration: Calibration required
		When external calibration or "CAL check": Request "Open or close external calibrated leak"
	open:	No request: Calibration not required
Calibration active	closed:	Device is to be calibrated.
	open:	Device is not to be calibrated.
Calibration stable	closed:	Calibration completed with calibration leak
	open:	Assignment not stable or calibration is inactive
Cathode 2	closed:	Cathode 2 is active
	open:	Cathode 1 is active
Measuring	closed:	Measuring (ZERO is possible, all setpoint outputs switch depending on the leak rate.)
	open:	Standby or emission disabled (ZERO is not possible, all setpoint outputs will return "Leak rate threshold value exceeded".)
Open	open:	always open
Sniff	closed:	Operation mode Sniffing active
	open:	Operation mode Vacuum active
Setpoint 1	closed:	Measured leak rate exceeds the setpoint 1
	open:	Measured leak rate undercuts the setpoint 1
Setpoint 2	closed:	Measured leak rate exceeds the setpoint 2
	open:	Measured leak rate undercuts the setpoint 2
Setpoint 3	closed:	Measured leak rate exceeds the setpoint 3
	open:	Measured leak rate undercuts the setpoint 3
Setpoint 4	closed:	Measured leak rate exceeds the setpoint 4
	open:	Measured leak rate undercuts the setpoint 4
PURGE	closed:	Purge valve open
	open:	Purge valve closed
Standby or evacuate	closed:	State standby or evacuate active
	open:	State standby or evacuate not active, such as when measuring
Status calibration leak valve	closed:	Calibration leak valve is open
	open:	Calibration leak valve closed
Vent	closed:	Internal vent valve open.

Function	State:	Description
Warning	open:	Internal vent valve closed
	closed:	Warning
ZERO active	open:	No warning
	closed:	ZERO switched on
	open:	ZERO switched off

### 10.2.3 Configure digital inputs

These inputs can be used to operate the device with a programmable logic controller (PLC).

The digital inputs PLC-IN 1 ... The available functions can be assigned in any way necessary to the 10 IO Interface.

– Active signal: typically 24 V

– Inactive signal: typically 0 V.

The 24V output of the IO Interface can be used as an active signal.

Every function can be inverted.

✓  **Supervisor** - rights

1  > Setup > Accessories > I/O module > Configuration of digital Inputs

2 Select as desired "Digital input".

⇒ The inputs PLC-IN 1 - 10 are available.

3 Select the desired Function, see the table below.

4 Select the desired Mode.

⇒ The modes "Standard" or the mode "Inverse" are available for selection.

To mode "Inverse": In the following table overview, the arrow pointing the transfer direction in the column "Transition" must be reversed.

5 Save .

Function	Transition	Description
Vent	inactive→ active:	Vent inlet (only in standby state)
CAL	inactive→ active:	Start calibration.
	active→ inactive:	Apply value for background and finish calibration.
No function	-	The input is not functioning. Recommended setting of unused inputs.
delete	inactive→ active:	Erase warning or error message / cancel calibration.
Sniff	inactive→ active:	Enable sniffer mode.
	active→ inactive:	Enable vacuum mode.

Function	Transition	Description
PURGE	inactive→ active:	Switch-on purge (only in standby state)
	active→ inactive:	Switch-off purge (only in standby state)
Start	inactive→ active:	Change to the measurement mode.
Start/Stop	inactive→ active:	Change to the measurement mode.
	active→ inactive:	Switch to Standby.
STOP	inactive→ active:	Switch to Standby.
ZERO	inactive→ active:	Switch ZERO on.
	active→ inactive:	Switch ZERO off.

## 10.2.4 Configuring analog outputs

### ✓ Supervisor - rights

- 1  > Setup > Accessories > I/O module > Configuration of analog outputs
- 2 Set-up the "Analog output 1".
  - ⇒ You can choose from "Off", Pressure p1", Pressure p2", "Leak rate mantissa", "Leak rate exponent", "Leak rate linear", "Leak rate logarithmic", "Leak rate mantissa hyst.", and "Via interface".
- 3 Set-up the "Analog output 2".
  - ⇒ You can choose from "Off", Pressure p1", Pressure p2", "Leak rate mantissa", "Leak rate exponent", "Leak rate linear", "Leak rate logarithmic", "Leak rate mantissa hyst.", and "Via interface".
- 4 Set-up the "Analog output scaling".
  - ⇒ You can choose between "0.5 V / decade", "1 V / decade", "2 V / decade", "2.5 V / decade", "3 V / decade", "5 V / decade" or "10 V / decade".
- 5 Set-up the "Exponent upper limit".
- 6 Save .



The settings "Analog output scaling" and "Upper limit exponent" affect both analog outputs dependent on the selected function, see the table overview below.

### Functions and assignment of analog outputs:

Off	The analog outputs are switched off (Output voltage = 0 V).	
-----	--	--

Pressure p1 / Pressure p2	1 ... 10 V; 0.5 V / decade; logarithmic $1 \text{ V} = 1 \times 10^{-3} \text{ mbar}$	
Leak rate mantissa	1 ... 10 V; linear; in selected interface unit	Useful only if the other analog output is assigned "Leak rate exponent". For new developments, the setting "Leak rate mantissa hyst" is preferred instead.
Leak rate exponent	1 ... 10 V; 0.5 V / decade; Step function; $1 \text{ V} = 1 \times 10^{-12}$ ; in selected interface unit	Useful only if the other analog output "Leak rate mantissa" or "Leak rate mantissa hyst." is assigned.
Linear leak rate	0 ... 10 V; linear; in selected interface unit	<p>The upper limit (= 10 V) is set via the parameter "Exponent upper limit" in whole decades. The lower value is always 0 (leak rate), which corresponds to 0 V output voltage.</p> <p>This setting is for both analog outputs, if an appropriate output function is selected. Depending on the selected leak rate unit there is a different absolute limit.</p> <p>The selected range can be additionally narrowed by the limits, which is valid for all interfaces.</p>
Leak rate log.	0 ... 10 V; logarithmic; in selected interface unit	<p>The upper limit (= 10 V) and the scale (V / decades) are set via the parameters "Exponent upper limit" and "Analog output scaling".</p> <p>For example: Upper limit set to <math>1 \times 10^{-5} \text{ mbar l/s}</math> (= 10 V). Scale set to 5 V / decade. The lower limit is thus <math>1 \times 10^{-7} \text{ mbar l/s}</math> (= 0 V). The logarithmic output function of both the slope in V / decade as well as the upper limit (10 V limit) can be set. This results in the minimum displayable value. The following slopes are available: 0.5, 1, 2, 2.5, 3, 5, 10 V/decade. The higher the selected slope value, the smaller the displayable area. The upper limit is the same for both analog outputs. Depending on the selected leak rate unit there is a different absolute limit.</p>
Leak rate mantissa hyst.	0.7 ... 10 V; linear; in selected interface unit	Useful only if the other analog output is assigned "Leak rate exponent". Through an overlap of the mantissa in the range 0.7 to 1.0, a constant jumping between two decades is prevented. 0.7 V corresponds to a leak rate of $0.7 \times 10^{-x}$ . 9.9 V corresponds to a leak rate of $9.9 \times 10^{-x}$ .

About Interface: The output voltage can be set via the LD log command 221.

## 10.2.5 Setting Up the IO Interface log

For switching between ASCII and LD log for the RS232 connection on the IO Interface.

✓  **Supervisor** - rights

- 1  > Setup > Accessories > I/O module > I/O module log
- 2 Set up.
- 3 Save .



The interface protocol can be selected either via this setting or via the DIP switches on the IO Interface. Therefore, under certain conditions, the setting selected here may not match the active log.

## 10.3 Bus module

On the USB flash drive, which is included with the device and the bus module, you will find further files concerning the bus module. This also includes the GSD file for PROFIBUS, which is located in the “..\Manuals\Interface Description“ folder.

For the different bus modules see also “Accessories and spare parts”.

### 10.3.1 Creating a connection between the device and the bus module

✓  **Supervisor** - rights

- 1 Switch off the leak detector.
- 2 Connect the bus module with a data cable to the LD socket on the device, see “Connections for accessories and control signals [▶ 26]“.
- 3 Switch on the leak detector.
- 4  > Setup > Accessories > Device selection
- 5 Select "Bus module".
- 6 Save .

### 10.3.2 Setting a bus module address

You can set the setpoint for the field bus address. With PROFIBUS® this is the node address. DeviceNet is the MAC ID.

This setting is irrelevant for Profinet and EtherNet/IP.

✓  **Supervisor** - rights

1  > Setup > Accessories > Bus module

2 Enter the desired address in the "Bus module address" field.

3 Confirm with .

⇒ The value set is first carried over when restarting the leak detector. To do this, switch the power supply off and back on.

## 10.4 Network

### 10.4.1 Operate leak detector via web browser (LAN)

#### NOTICE

##### Operating system can be attacked via USB or Ethernet

The Linux operating system used in the leak detector is not updated automatically and can therefore contain security gaps. This vulnerability may be exploited through the Ethernet and USB interfaces of the leak detector to provide unauthorized access to the system.

- ▶ Ensure that no unauthorized person has access to these interfaces, for example through a USB port / Ethernet port lock.
- ▶ In order not to jeopardize the security of your company network, never connect the leak detector directly to the public Internet. This is true for connections over WLAN as well as over Ethernet.
- ▶ However, if you want to access the web interface of the leak detector remotely, we recommend an encrypted Virtual Private Network (VPN) connection. However, we cannot assume any guarantee for the security of VPN connections, which are provided by third parties.

#### 10.4.1.1 Configure the LAN connection of the leak detector

✓  **Supervisor** - rights

1  > Setup > Network > LAN settings

2 Select your LAN setting:

⇒ Disabled: Even when the network cable (RJ45 socket) is connected, no network connection is established.

⇒ DHCP: The leak detector automatically obtains an IP address through the network into which it is integrated.

- ⇒ Static: The IP address, as well as the network mask and gateway have to be configured manually, so that the leak detector can be reached in the network. If necessary, contact a network administrator.

3 Save .

### 10.4.1.2 Setting the LAN connection in the PC or Tablet



#### LAN connection - quick start

If you have performed the steps described here once, it is sufficient to enter the IP address for many devices in case of repetition.

- ✓ The PC is connected to the same network as the leak detector.
- ✓ A LAN setting has been set up in the configuration of the leak detector, see also "Configure the LAN connection of the leak detector [▶ 111]".
- ✓ You have noted down the IP address of the leak detector. It can be found in the leak detector under "☰ > Information > Device > Network".
- ✓ Java Script is enabled in the web browser. We recommend using a current version of the web browser Chrome™, Firefox® or Safari®.
- ▶ To access the leak tester from the PC or tablet web browser, enter the IP address of the leak detector as follows:  
http://<IP address>
  - ⇒ The current active user interface of the leak detector is called.
  - ⇒ The same functionality is available on the PC or Tablet as on the touchscreen of the leak detector.  
If you can only see the user interface of the leak detector but cannot operate it, check whether the client access is permitted in the leak detector, see also "Configure the LAN connection of the leak detector [▶ 111]".

#### See also

-  Connections for accessories and control signals [▶ 26]

### 10.4.1.3 Allow client access

- ✓  **Supervisor** - rights
  - 1  > Setup > Network > Client Access
  - 2 To allow the leak detector to be operated by PC or Tablet, activate the "Client Access" option.
    - ⇒ If the option "Client Access" is not activated, the leak detector cannot be operated via LAN. No settings can then be changed.
  - 3 Save .



### Display of all connected clients

- ✓ The network connection (LAN) between the leak detector and one or more PCs or Tablets has been established, see “Setting the LAN connection in the PC or Tablet [▶ 112]”.
- ▶  > Setup > Network > Connected clients

## 10.4.2 Operate leak detector via web browser (wireless LAN)

### NOTICE

#### Operating system can be attacked via USB or Ethernet

The Linux operating system used in the leak testing is not updated automatically and can therefore contain security gaps. This vulnerability may be exploited through the Ethernet and USB interfaces of the leak testing to provide unauthorized access to the system.

- ▶ Ensure that no unauthorized person has access to these interfaces, for example through a USB port / Ethernet port lock.
- ▶ In order not to jeopardize the security of your company network, never connect the leak testing directly to the public Internet. This is true for connections over WLAN as well as over Ethernet.
- ▶ However, if you want to access the web interface of the leak testing remotely, we recommend an encrypted Virtual Private Network (VPN) connection. However, we cannot assume any guarantee for the security of VPN connections, which are provided by third parties.

To access the user interface of the leak detector via wireless LAN, a wireless LAN USB adapter with access point technology must be plugged into the back of the device.

Minimum technical requirements:

- Interface: USB 2.0
- USB port: Type A
- Chipset: RTL819x or similar
- Support to: Access Point Client Mode

“EDIMAX EW-7612UAn V2” is a wireless LAN capable USB adapter, which meets the specification and has been tested with the leak detector.



The wireless LAN connection can be susceptible to interference. The stability depends on the range, shielding walls, other wireless networks, interfering transmitters in the vicinity and other factors.

### 10.4.2.1 Configure the wireless LAN connection of the leak detector

✓  **Supervisor** - rights

1  > Setup > Network > WLAN

2 To set-up that the device supports the WLAN connection activate the option "Enable Wireless LAN".

⇒ If the wireless LAN capable USB adapter is inserted, this will automatically start the Access Point. In order to configure the WLAN adapter of the leak detector, no USB adapter needs to be inserted.

3 In the field "Name (SSID)" enter the desired network name and in the field "Network key" the desired Network key. "Name (SSID)" and "Network key" have the following values preset: "Phoenix" or "Phoenix40" respectively. The Network key must have at least 8 characters.

4 Save .

### 10.4.2.2 Setting the wireless LAN connection in the PC or Tablet



#### Wireless LAN connection - quick-start

If you have already performed these preset work steps, then on most devices it is sufficient just to enter the URL.

✓ A wireless LAN capable USB adapter with wireless LAN Access Point Technology is connected to a USB port on the rear of the leak detector, see "Connections for accessories and control signals [▶ 26]".

✓ In the configuration of the leak detector, the option "Enabled" is activated, see Configure the wireless LAN connection of the leak detector [▶ 114].

✓ The WLAN connection is automatically detected by the client.

✓ With old devices WPA2 may need to be set-up as the encoding.

✓ Java Script is enabled in the web browser. We recommend using a current version of the web browser Chrome™, Firefox® or Safari®.

1 Check the wireless settings of your PC or tablet to see if you are already connected to the wireless LAN of the leak detector.

2 If it is not connected to the WLAN of the leak detector, select the WLAN of the leak detector and enter if necessary the Network key, see "Configure the wireless LAN connection of the leak detector [▶ 114]".

- 3 To access the leak detector via the web browser of the PC or tablet, use the following URL:  
phoenix.leybold.com
- ⇒ The user interface of the leak detector is called up.
  - ⇒ The same functionality is available on the PC or Tablet as on the touchscreen of the leak detector.  
If you can only see the user interface of the leak detector but cannot operate it, check whether the client access is permitted in the leak detector, see also "Configure the wireless LAN connection of the leak detector [▶ 114]".

### 10.4.2.3 Allow client access

- ✓  **Supervisor** - rights
- 1  > Setup > Network > Client Access
- 2 To allow the leak detector to be operated by PC or Tablet, activate the "Client Access" option.
  - ⇒ If the option "Client Access" is not activated, the leak detector cannot be operated via WLAN. No settings can then be changed.
- 3 Save .



#### Display of all connected clients

- ✓ The network connection between the leak detector and one or more PCs or Tablets has been established, see "Setting the wireless LAN connection in the PC or Tablet [▶ 114]".
  - ▶  > Setup > Network > Connected clients
-

# 11 Appendix

## 11.1 Menu path

Pressing the navigation button  brings you back to the measurement display regardless of whether you were previously in a menu or sub-menu.

### 11.1.1 Diagnosis

	Confirmed warnings*			
	Errors and warnings*			
Information	Assemblies	Ion source		
		MSB		
		TMP		
		Preamplifier		
		Energy	Power	
			Voltage (1)	
			Voltage (2)	
		Device	Operating hours	
			Identification	
			Network	
		Help	Errors and warnings	
		Calibration		
		Measurement values	Run times	
	Leak rate and pressure			
	Temperature			
	Log	Errors and warnings		
		Calibrations		
		Maintenance		
	Accessories	I/O-Module		
RC310				
Bus module				
Vacuum diagram				
Measurement data	Measurement cycles			
	Display measurement data			
	Data recording			
	Data recording diagnostics			
Regeneration				
Update	Update interface			
	Update device			
	Unlock feature			
Reset	Resetting the settings			
	Deleting data			

\* Can only be seen when active

### 11.1.2 Settings

	Display	General		
		Bar graph		
		Line graph		
		Switch monitor	External monitor	
			Internal monitor	
	Audio			
	User accounts	Logoff		
		Manage automatic login		
		Manage user accounts		
		Change own PIN		
		Change own language		
		Favorites		
	Operation mode	Vacuum, Sniff		
	Lock screen			
	Setup	General	Date and time	
			Units	
		Measurement	Pressure limits	
			Mass	Helium, Mass 3, Hydrogen
			Calibration leak	External, Machine factor
			Vacuum	Ranges, Ventilation, Purge/Gas ballast
			Sniff	Capillary surveillance
			Protection	
			Miscellaneous	Calibration request, Local control
			Partial flow	
		ZERO and filter	ZERO, Filter, Background	
		Network	Connected clients	
			WLAN	
			LAN settings	
			Client Access	
		Data recording		
Maintenance requests				
Maintenance counters				
Accessories		Bus module		
		Device selection		
	I/O module	I/O module log		
		Configuration of analog outputs		
		Configuration of digital outputs		
RC310		Configuration of digital inputs		
Sets of parameters	Parameter list			
	Manage sets of parameters			
Setpoints				

## 11.2 CE Declaration of Conformity



### EU Declaration of Conformity

*(Translation of original Declaration of Conformity)*

**The manufacturer:** Leybold GmbH  
Bonner Strasse 498  
D-50968 Köln, Germany

herewith declares that the products specified and listed below which we have placed on the market, comply with the applicable EU Directives. This declaration becomes invalid if modifications are made to the product without agreement of Leybold GmbH.

**Product designation:** Leak detector  
**Type designation:** PHOENIX Quadro  
PHOENIX Quadro dry  
**Part numbers:** 250000V02, 251000V02, 251100V02  
250001V02

**The products comply with the following Directives:**

Machinery Directive (2006/42/EC)

The safety objectives of the Low Voltage Directive 2014/35/EU were complied with in accordance with Appendix 1 No. 1.5.1 of Machinery Directive 2006/42/EC.

Electromagnetic Compatibility (2014/30/EU)

Directive RoHS (2011/65/EU)

**The following harmonized standards have been applied:**

EN ISO 12100:2010	Safety of machinery — General principles for design — Risk assessment and risk reduction
EN 61010-1:2010	Safety requirements for electrical equipment for measurement, control, and laboratory use — Part 1: General requirements
EN 61326-1:2013	Electrical equipment for measurement, control and laboratory use — EMC requirements — Part 1: General requirements Emissions: Group 1, Class A Immunity: Industrial electromagnetic environment
EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

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